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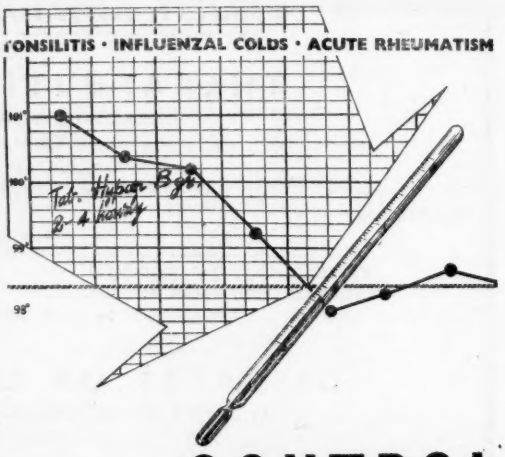

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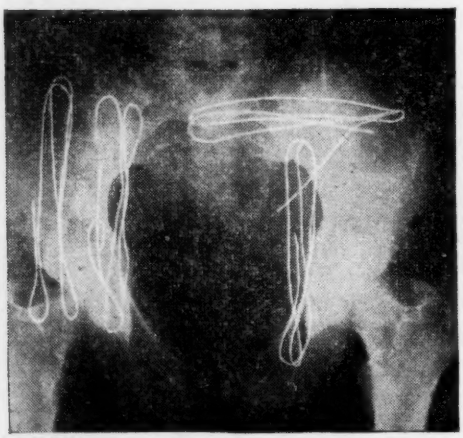

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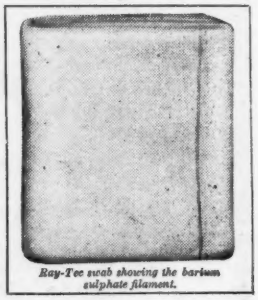

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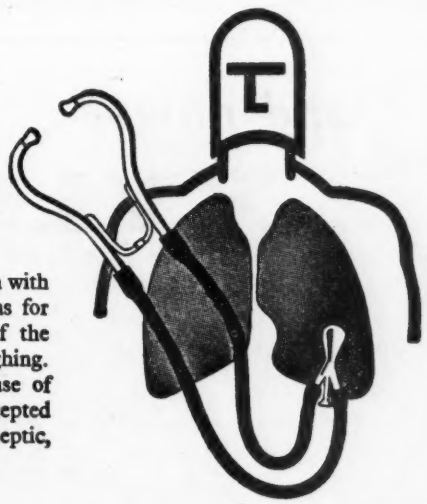

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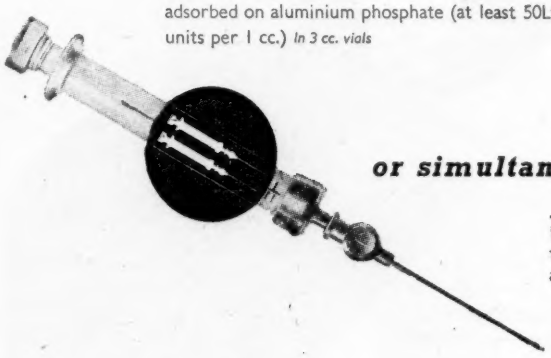

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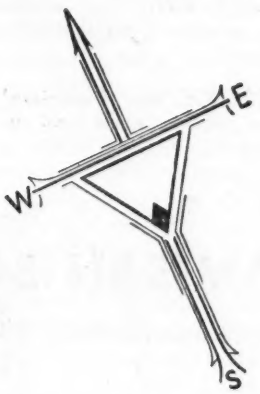

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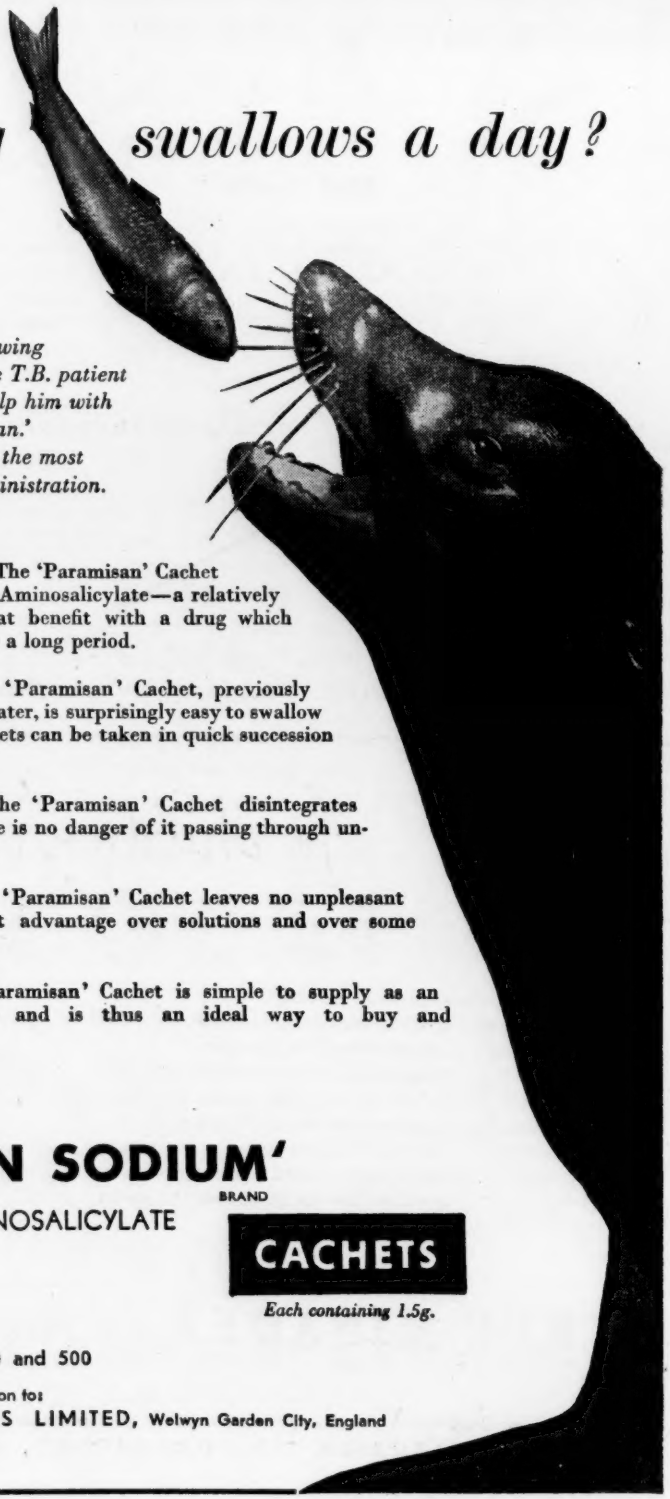

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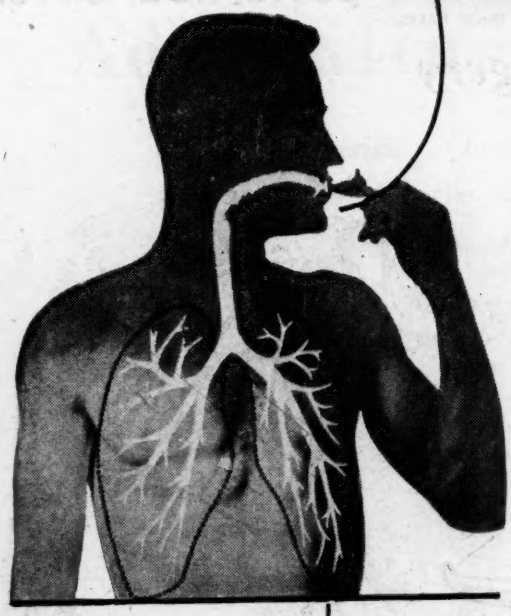

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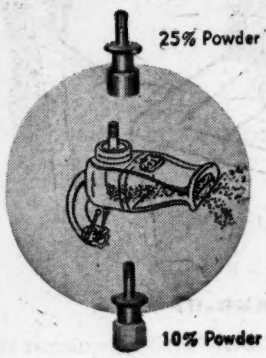

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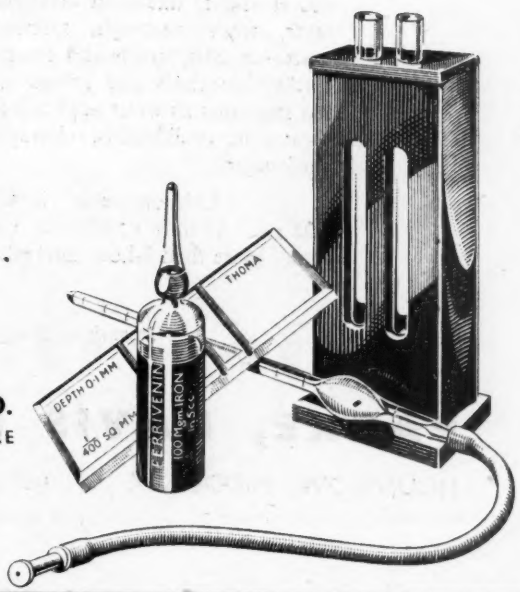

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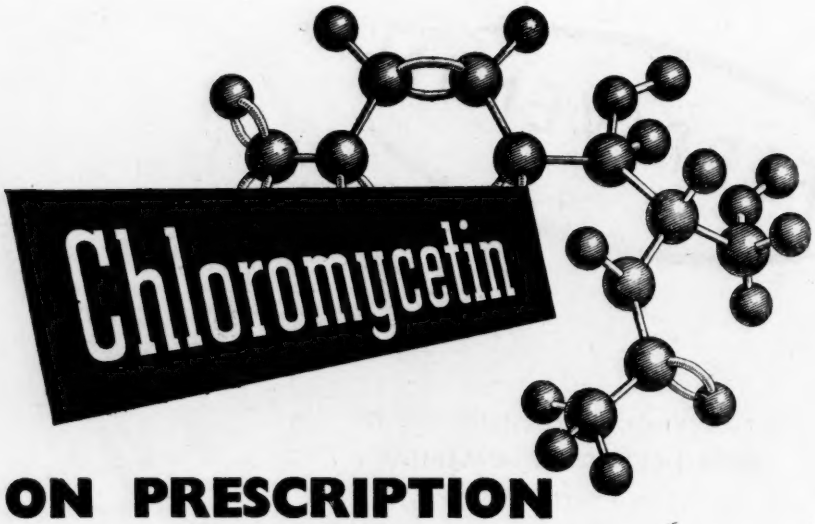

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RECENT HISTORY OF CORONARY DISEASE[1]

J. N. MORRIS
M.A. Glasg., M.R.C.P., D.P.H.
From the Social Medicine Research Unit, Medical Research Council

CORONARY heart-disease has emerged from obscurity since the first world war. Angina pectoris has been diagnosed more often, and coronary thrombosis, coronary occlusion, and myocardial infarction have become established as common disorders. In England and Wales the standardised mortality from "diseases of the coronary arteries and angina pectoris," following an even steeper increase, almost doubled between 1938 and 1948. In 1948 the number of deaths so certified in persons under 70 years of age was nearly 20,000 (Registrar-General 1931–48).

If the increase is real, in whole or in part, it presents a crucial problem for social medicine; for causes may be discoverable in changing ways of living, in people who are changing in a changing environment. To make its contribution social medicine can carry out case studies and epidemiological inquiries. The latter need their measurements as much as the former: how much coronary heart-disease is there, and how much atheroma? Which groups suffer more and which less, and in what circumstances of time, place, and society? The present report deals mainly with an attempt to devise a measurement of the prevalence of coronary atheroma in the population, and with the rather surprising results of its application to the historical question. But first the evidence for the increase of coronary heart-disease will be briefly re-examined.

Increase of Coronary Heart-disease

It is exceedingly difficult to estimate how much of the apparent increase of coronary heart-disease represents greater prevalence, and how much is due to better diagnosis or to changing fashions in diagnosis. Clinical experience unrelated to a defined population is necessarily uncertain; but in the light of the long history of angina pectoris the impression of so many clinicians—e.g., Cassidy (1946), Hutchison (1950), Perring (1949), Yater et al. (1948)—that the disease is commoner, and is appearing in younger people, cannot be dismissed. Probably some of the increase shown in the Registrar-General's tables is due to a growing tendency to diagnose and certify "coronary thrombosis," &c., instead of "myocarditis," &c.; but it is improbable in the light of the published statistics, as illustrated in fig. 1, that this is the whole story (see also Ryle and Russell 1949). The real test of field inquiry into the quality of certification practices in this very confused area has not, however, been tried.

EVIDENCE FROM NECROPSIES

Necropsy findings are another source of information, and these have been insufficiently studied. Because of the nature of ischæmic heart-disease such records are available in two places—the coroner's court and the hospital.

Sudden Death

Ischæmic heart-disease may be the commonest cause of death now discovered by the coroner's pathologist (Simpson 1947, 1950). A sample analysis of its most obvious manifestation, spontaneous rupture of a cardiac ventricle in the elderly, from the coroners' records of Cardiff, Liverpool, the East and West districts of London, and Manchester shows an increase, at 60–74 years of age, from 18 cases in 1932 to 47 in 1949. This represents an increase of more than twice, when the local losses of population as well as the general ageing trend are considered. It is unlikely that changes during this short period in the conditions under which this kind of case was brought to medicolegal necropsy (some tending to raise the number, others to lower it), and in the quality of the pathological practice, could have explained so big an increase.[2] Clearly the condition is no longer a curiosity, though it can only be appreciated in the coroner's court. Krumbhaar and Crowell (1925) collected fewer than 600 cases in their review of the literature from 1872. In England and Wales it may be estimated on the above figures, and on similar ones obtained from other parts of the country, that there were quite possibly more than 600 cases at the age of 60–74 in the one year 1949.[3]

HOSPITAL PATHOLOGY

A wider view of the problem, however, is necessary, and a longer perspective; and here only hospital records can help. One hospital has been studied in particular. Before the first world war the pathological department of the London Hospital (table I) had, on average, one or two necropsies a year with a recent coronary thrombosis and/or acute cardiac infarction. Since then the number has risen considerably, the increase being fairly uniform after 35 years of age and in both sexes. There are two trends of interest in the table: the over-all increase of six or seven times, and the steeper incline during and immediately after the first war compared with later (fig. 2). The average annual proportional increase from

1. "Coronary disease" is taken here to include (1) coronary atheroma (atherosclerosis) and (2) coronary, ischæmic (arteriosclerotic) heart-disease, particularly the syndrome of thrombosis, occlusion, and infarction, and its variants. "Ischæmic" heart-disease is the most accurate term, but "coronary" heart-disease is convenient and in too common use to be discarded.

2. Bedford's (1933) analysis of the cases "B(rought) I(n) D(ead)" to the General Infirmary in 1910–30 indicates that coronary heart-disease increased $2^1/_2$–3 times in Leeds. Unfortunately this series cannot be continued to date.

3. 128 cases in a population of about 9,000,000, and including only those reported to the coroner.

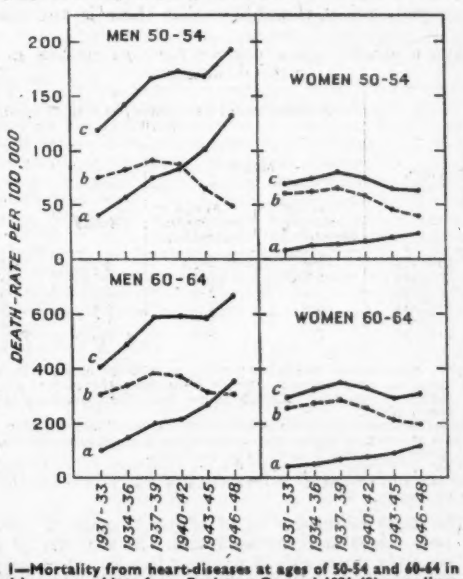

Fig. 1—Mortality from heart-diseases at ages of 50-54 and 60-64 in men and in women (data from Registrar-General 1931-48): *a*, diseases of coronary arteries, angina pectoris; *b*, chronic myocardial diseases, but including myocardial infarction; *c*, sum of *a* and *b*.

1907–14 to 1919–23 was about five times greater than that from 1919–23 to 1944–49. These figures seem clear enough, but it is difficult to assess material drawn from so long a period; and, before we accept the trends of table I as evidence of long-term and short-term increases in the prevalence, other possibilities must be considered.

Interpretation of Data

The first possibility, of course, is that the increase is not real but merely reflects better post-mortem diagnosis. This is an unlikely explanation. There is abundant evidence throughout the forty years that the department was fully aware of the relation of infarction to thrombosis, of myocardial fibrosis to gradual occlusion, and of the topical pathology of ostial stenosis and infarction from embolism, as indeed were many pathologists last century—see Herrick (1942), Parkinson and Bedford (1928), Willius and Dry (1948). But what makes these figures important is that, unlike other series of this kind, they are based on the *routine* examination at necropsy of the myocardium *and* of the coronary arteries over the whole period. Moreover Prof. H. M. Turnbull, director of the department, was making a special study of atheroma and arterial disease in general during 1907–14 (Turnbull 1915). The possibility that cases were overlooked is therefore small, and the earlier material is as likely to be reliable as the later. As an additional precaution the records were scrutinised, and only definite unequivocal cases with either or both of these two obvious macroscopic conditions were included—i.e., only such of the more modern cases as, it may be presumed, any competent pathologist conducting the necessary routine examination, at any time, would have recognised. In this way some allowance could be made for the greater interest in coronary heart-disease of recent years—though Sir James Mackenzie was in charge of the cardiac department before the 1914–18 war (Mackenzie 1914)—and for the stimulus of more frequent clinical diagnosis. There is also probably a keener appreciation today of the very recent infarct, and of the possible significance of coronary stenosis and occlusion without definite recent thrombosis or obvious infarction, in cases of sudden and unexplained death. The clinical position has changed entirely in recent years [4] (indeed there may be a problem today of overdiagnosis rather than underdiagnosis), but it is unlikely that there is any readier recognition of the two selected post-mortem manifestations. It is of interest, too, that the incidence of cases after 1912, after 1925, and before 1939 shows no evidence that the papers of Herrick (1912) or McNee (1926) or the keen interest of the 1930s seriously affected this particular experience. The increase began about 1917, thus antedating Herrick's second (1919) paper.

TABLE I—DEATHS FROM CORONARY HEART-DISEASE IN THE LONDON HOSPITAL

Years	Average no. of necropsies per year at age of 35–70			
	Males		Females	Total
	Recent coronary thrombosis*	Acute myocardial infarction†	Both‡	
1907–14	1·1	0·25	0·25	1·6
1915–18	2·25	0·5	0·75	3·5
1919–23	3·4	1·6	0·8	5·8
1927–31	3·6	1·2	1·4	6·2
1935–39	4·4	1·8	1·8	8·0
1944–49	5·5	3·0	2·0	10·5

*Fresh, unorganised thrombus; with or without acute infarction.
†Or necrosis, or rupture; due to coronary atheroma; without recent thrombosis (though there was often evidence of *old* thrombosis).
‡Recent coronary thrombosis and acute myocardial infarction.
Cases of coronary embolism, occlusion by atheromatous debris, and with syphilitic aortitis have been excluded.
Cases with recognised diabetes have been included; in 1907–14 there was 1 in 13 cases; in 1944–49 there were 7—3 in 53 men, and 4 in 12 women.

The fact of an increased number of cases seems established, but this does not necessarily indicate greater prevalence of the disease, though it is the obvious explanation. The population served by the hospital might have increased six or seven times at all ages or, more likely, in the older ages. There is no hint of this in the number of admissions, which might in some circumstances reflect such an increase. The Registrar-General's censuses of 1911, 1921, and 1931 show that the local population of the relevant ages changed little from 1911 to 1921; and it is now much smaller than it used to be (Registrar-General 1947, 1949); and the order of increase shown in table I obtains for local cases drawn from the neighbourhood as well as for the total number of cases.

The main difficulty, however, in this kind of problem is that of changes in the hospital's admission policy (influenced, for instance, by the development of the cardiac department) causing a greater proportion of the available cases to be attracted to the hospital, and consequently a genuine increase in numbers which may not be due to greater prevalence in the population served. This would be less likely to happen with the "emergencies" of coronary heart-disease than with a more chronic condition like bronchogenic carcinoma (where, in addition, recognition and therapeutic possibilities have varied over the years). Moreover, about a third of the present cases both in 1907–14 and 1919–23 were "B.I.D." The point is interesting because selective factors almost certainly operated in the later years of 1907–49 (Parkinson and Bedford 1928), when the pathological experience increased relatively little, whereas almost as certainly they did not operate in the earlier years, when it was increasing substantially.

It seems likely, therefore, that table I illustrates a real increase in prevalence, especially from 1907–14 to 1919–23; but there is no point in labouring such arguments and trying to use these figures as a *measure* of the increase.[5] It should be possible to gather similar evidence, at least of the larger infarcts, from other hospitals where there was interest in these conditions. In Guy's Hospital, for instance, there were 3 such cases in 1910–14 and 10 in 1919–23.

CONCLUSION

There is no "correct" answer to this kind of historical question in the absence of elementary information, over a period of time, about the basic ratio and in particular about the denominator of the basic ratio

$$\frac{\text{Number of phenomena, cases, deaths, \&c.}}{\text{Population in which these are occurring, \&c.}}$$

—the "&c." referring to such details as sex and age. Bits and pieces of evidence, singly not of high quality,

4. The death certificates of 12 of the 13 cases of 1907–14 were traced at Somerset House. In 4 of the 10 with coronary thrombosis at necropsy this was mentioned on the certificate. Of the 2 with infarction alone, 1 was ascribed to "angina pectoris, syncope," but the infarct was not mentioned.

5. The usual method of dealing with such a problem would be to calculate the ratio of

$$\frac{\text{Necropsies with coronary heart-disease}}{\text{All necropsies}}$$

This ratio, for males aged 35–69, was 0·6% (of a total of 2000) in 1907–14, 2·6% (of 947) in 1919–23, and 6% (of 860) in 1944–49—i.e., the annual rate of increase is again about five times as great from the first to the second period as from the second to the third. But the method is of doubtful validity. It ignores the very real changes that may have occurred in the denominator—e.g., the decline of mortality of infectious disease. More generally it assumes that, apart from a real change in the prevalence of the disease (the numerator), all the other factors discussed above that might affect the numerator and/or the denominator have changed in time so as to affect them proportionately, or to an ascertainably different degree. This is an assumption indeed; and, whereas it may be possible, as in the present instance, to estimate the broad effect of these selective and other factors on the numerator, it is usually impossible or impracticable to do so, except in the short run, for the multiple conditions comprising the denominator.

have to be put together in the hope of obtaining the broad facts. In the present instance most of the evidence points in the same direction: the conjunction of clinical, registration, coroners', and hospital experience suggests that there has been a true increase in the prevalence of coronary heart-disease during this century. Such hospital evidence as this suggests further that coronary thrombosis and myocardial infarction, clearly described clinically only shortly before the 1914–18 war and not commonly diagnosed till after it, may have been rare before it (Brooks 1906, Mackenzie 1914, Norris 1911), and did not become common till after it. The biggest increase may have been in 1917–23. If that is so, the scepticism of some contemporary clinicians about the increase of coronary heart-disease would partly be justified, for this may have taken place mainly in the experience of a previous generation, whereas in their own these conditions have throughout been common.

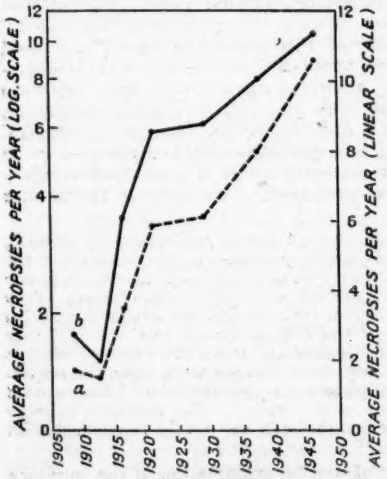

Fig. 2—Deaths from recent coronary thrombosis and acute myocardial infection at the age of 35-70 in men and in women (data from necropsies at the London Hospital): *a*, linear scale; *b*, logarithmic scale (equal vertical distances represent equal percentage changes).

History of Coronary Atheroma

Coronary heart-disease is associated generally with advanced coronary atheroma; the latter is considered to be the underlying lesion, and the former to be a complication of it. The usual explanation of the increase of the heart-disease is by an increase of the atheroma, which has never been proven. Coronary atheroma is common in the adult population and is progressive. Obviously it is important to examine the course of the atheroma during the years in which there is evidence that the heart-disease increased. For this purpose an indicator of the prevalence of coronary atheroma in the population is needed, and one that can be projected back before the first world war. There is only one possible source for such an indicator. No study of people now alive could help; nor can death certificates be of any use. The investigation could be made from necropsy records of samples of the population; but no such material is available for any period. Sufficiently comprehensive coroners' records do not exist, so far as I am aware. The alternative therefore remains of investigating the problem from hospital necropsy material, or not at all; and the only suitable hospitals are large academic institutions where the condition of the coronary arteries has been recorded routinely over many years. As already mentioned, the London Hospital is such a hospital, and the study was therefore carried out there.

MATERIAL AND METHODS

There are two aspects of the indicator which is needed: (1) what can be taken to represent the population at large? and (2) what can be used as the measure of coronary atheroma?

Defining the Population: General

It is never justifiable to assume without examination that any hospital data are a cross-section of the general population in any respect—hence the discussion of table I to establish whether the large changes in it reflect even broadly the course of events in the general population. As regards coronary disease, for instance, hospital necropsy material may be classified, by main cause of death, as follows:

Group A: Deaths from Coronary Heart-disease.—Table I illustrates the more dramatic manifestations of these. There are also a smaller number of cases without definite recent thrombosis or acute infarction, and of more insidious forms of ischæmic heart-disease which are relatively unimportant in the ages studied.

Group B: Deaths from Conditions Associated with Coronary Disease, especially hypertension (with or without chronic nephritis) and its complications; deaths from arterial degeneration in other sites; and cases with diabetes.

Group C: Deaths from Other Conditions, the remainder, and great majority of necropsies. Deaths from a wide variety of conditions—malignant disease, infections, injuries and operations, rheumatic and pulmonary heart-disease, &c.

The present problem is to estimate the prevalence of coronary atheroma in the whole population, those with coronary heart-disease, those with conditions associated, and the majority. But it is impossible to obtain or to set up a representative sample of any such whole population from hospital necropsy material, which, even at best, is typical only of the recently dead, who form a small and special part of it. Groups A, B, and C cannot simply be added together, because, whereas patients with coronary heart-disease may form only 1% of the middle-aged population as a whole, group A may constitute almost any fraction of the necropsy material, depending on factors already discussed. The same objection applies to the use of group B as a measure of those in the population who have hypertension or other associated diseases. What can be done, however, is this. Groups A, B, and C conform broadly to the relevant categories in the population; and it is therefore possible to use them as indicators of what is happening in these categories without implying that the fraction each group forms of the necropsy material bears any relation whatever to the fraction its corresponding category forms of the whole population. Later, so far as is necessary, an attempt can be made to estimate the true size of the various categories to obtain a view of what is happening in the whole population.

Group C does not at first sight represent any kind of population. But if the assumption can be made that there is no particular association, either positive or negative, between deaths (and necropsy) from cancer or infections, &c., and the state of the coronary arteries, such a miscellaneous collection may be considered typical, at least of the great mass of the "hospital class" of the population, living as well as recently dead, so far as the coronary arteries are concerned, and an adequate "sample" for this study. In some of the cases there may be conditions predisposing to coronary atheroma, in others conditions protecting from it; on balance these, on the whole, will tend to cancel out—or so it is postulated. This is certainly a big assumption.

Alternatively, since the problem is an historical one, analysis of the findings in such a collection as group C is worth while if the lesser assumption can be made that any association there may be between such deaths and the condition of the coronary arteries has not altered materially in the last forty years; changes found in the coronary arteries of this group will therefore not be due to the main conditions causing death, but will reflect changes occurring generally in the population. These are the kinds of assumption that need to be made if hospital data are to be usable in this kind of investigation (and, indeed, often, as "control" material at all).

The condition of the coronary arteries in group B deaths can be taken to indicate what is happening in the minority of the population with predisposing conditions; used in this way, as explained, it does not matter for the moment whether

the group is too large or too small in relation to the prevalence of these conditions in the total population.

Finally, as regards group A, no conceivable increase in the numbers with coronary heart-disease (e.g., an increase from 0·1% of the middle-aged population before the 1914–18 war to 1·0% now) could materially affect any totals of atheroma found from the analysis of the 99% or so covered in groups C and B—even if it is assumed that almost all of such sufferers had advanced degeneration. So group A may be safely ignored in this part of the study.

Defining the Population: Particular

The study was carried out on the remarkable collection of post-mortem reports of the London Hospital. The records were sorted A, B, and C, as described. Group A cases were put aside and have been dealt with already. Group B, forming rather less than 10% of the remainder in both sexes and in both periods, were kept separate from group C forming over 90%. Where the allocation was in doubt cases were relegated from C to B, and from C and B to A. It was decided to concentrate on the extremes of the 1907–49 span, over which the increase of coronary heart-disease is most certain. Two six-year periods were therefore studied in detail—1908–13 and 1944–49. In both periods the majority of patients dying in the hospital were brought to necropsy though the proportion was greater in the earlier period.

Standardisation

It is necessary to assure that the groups being compared were as like as possible—i.e., to "standardise" them. This involved a consideration of what is known or thought to be important in the development of coronary atheroma. Standardisation was straightforward for sex and age. A sample study of the occupations of the dead persons did not suggest that there has been any important change in the social status of this "population" in the past forty years; of course there has been some change, but it is still predominantly classes III–V (skilled, semi-skilled, and unskilled workers). An attempt was made to standardise for broad ethnic groups by using religion as an indicator, but this was unsuccessful; there is no doubt that the proportion of Jewish patients in both periods is higher than in the general population, but I did not form the impression that there had been any change that might matter. The addresses of the 1908–13 patients, like their religion, were not available; so no estimate of possible changes in the local proportion or of the urban/rural ratio was practicable.

A few other technical points may be mentioned here. Preliminary inspection showed that there was little change (a slight rise) in the average body-weight between 1908–13 and 1944–49; this factor was therefore ignored. The heart-weight was recorded in each case. No attempt was made to allow for the presence or absence of congenital abnormalities of the coronary circulation or of clinical coronary heart-disease incidental to the main condition from which these persons died: the former was not considered sufficiently important, and it would have been quite impracticable to assess the latter; the assumption had to be made that any such cases were similarly distributed in the different periods.

Dr. W. W. Woods has been carrying out or supervising a large number of the necropsies since 1911, but routine initialling of the reports was not begun till much later. Dr. Woods and Prof. D. S. Russell's reports alone were analysed for the 1944–49 figures in this part of the study; mostly they were by Dr. Woods. There was no particular selection in these cases. In the 1908–13 period two methods were used: (1) one-in-three samples were drawn for ages 30–49; and (2) the total number was analysed for ages 50–69.

The Indicator of Atheroma

It was necessary to choose a simple measure that sorted the records into meaningful categories at least of slighter and of more severe coronary atheroma; in which the differentiation was unequivocal and comparable for different periods; and which involved a minimum of interpretation by myself. After much experiment a report of calcification in the atheromatous lesions was finally adopted as the indicator of "advanced" atheroma, of protracted and/or severe degeneration, as indeed it is so regarded in the hospital. This divisor being used, doubt about thein appropriate category arose in only a small minority of the cases, and these were distributed as follows. When rarely the coronary atheroma was described merely as "severe," and when, as also occasionally happened, ulceration, hæmorrhage, stenosis, or occlusion was reported without accompanying calcification, the grading was "advanced." In the remainder of this paper the term "advanced atheroma" refers specifically to the above three definitions. "Slight" atheroma was scored "early" with the fatty lesions, as were also, without much conviction, some "nodular" and "atrophic" lesions in 1908–13. So few cases at any age were specifically stated to be free from atheroma—well under 5% at 50–69 years—that such were considered "early" for the secular comparisons.

A more difficult problem arose, particularly in 1908–13, when there was no specific statement on the condition of the coronary arteries in the summary reports available. In nearly all of these cases there was an obvious cause of death. They were commoner at younger ages, and the general description of the condition of the arterial system was usually "very slight" or "slight" atheroma. It therefore seemed prudent to include those "not stated" in the totals when the proportion of advanced atheroma was calculated—i.e., it was assumed in effect that they were "early." The negligible number where it was clear that the heart had not been examined at all were ignored.

The technique of routine examination of the coronary arteries with scissors has not altered materially in the period under review. Naked-eye descriptions alone were used. To preserve homogeneity I extracted, recorded, and classified all the reports myself, and as a routine precaution earlier and later years were scored alternately. The simplified procedures used meant inevitably the sacrifice of diagnostic refinement for the sake of comparability; but, as so often happens, the problem is not to find the perfect method but the best that is practicable.

CONDITION OF CORONARY ARTERIES 1908–49: GENERAL GROUP

Group C is a representative sample of the great mass of the population as regards their coronary arteries, or so it is postulated. Tables II and III assemble the data for this group, and fig. 3 illustrates them. These are the main findings:

(1) Coronary atheroma visible to the naked eye occurs in the great majority of persons after the age of 40.

TABLE II—PREVALENCE OF CORONARY ATHEROMA IN MALES AGED 30–70 AT NECROPSIES IN THE LONDON HOSPITAL

Age-group (yr.)	No. of cases									
	In 1908–13					In 1944–49				
	Early atheroma*	Advanced atheroma†	Not stated‡	Total	Proportion of total with advanced atheroma	Early atheroma*	Advanced atheroma†	Not stated‡	Total	Proportion of total with advanced atheroma
30–34	40	0	14	54	0%	14	0	0	14	0%
35–39	44	1	13	58	2%	25	0	1	26	0%
40–44	58	3	14	75	4%	40	0	5	45	0%
45–49	63	6	15	84	7%	45	0	3	48	0%
50–54	167	46	38	251	18%	59	3	2	64	5%
55–59	136	45	19	200	23%	46	7	2	55	13%
60–64	83	58	16	157	37%	61	20	3	84	24%
65–69	52	60	4	116	52%	52	21	1	74	28%
Total	643	219	133	995	Standardised rate at 50–69 years 30·4%	342	51	17	410	Standardised rate at 50–69 years 16·0%

*Fatty lesions (or nodular, or atrophic, and the few with no lesions).
†Lesions with calcification; (or ulceration, hæmorrhage, stenosis, occlusion; and described merely as "severe").
‡No specific statement in the reports on the condition of the coronary arteries.
These cases form group C. Deaths from coronary heart-disease, from hypertensive disease, from arteriosclerosis in other sites, and with recognised diabetes are not included.

(2) The amount of advanced atheroma, as defined, increases with age in both sexes.

(3) There has been no deterioration in the coronary arteries of the population in the period 1908–49, as indicated by the proportions of advanced cases in this series, and using the methods described.

(4) There was in this series less advanced atheroma in 1944–49 than in 1908–13 in both sexes and at all relevant ages.[6]

(5) There is no evidence in these tables that advanced atheroma is appearing at younger ages than formerly. On the contrary, the male rates of advanced atheroma in 1944–49 resemble those occurring in age-groups at least five years younger in 1908–13, and the female rates those occurring in age-groups at least ten years younger.

The decrease may be summarised by calculating a standardised rate of advanced coronary atheroma at 50–69 years of age based on the age-distribution of the population of England and Wales in 1947. This rate for males was 30·4% in 1908–13 and 16·0% in 1944–49, and for females 25·9% in 1908–13 and 7·5% in 1944–49. The reduction in males was 47% and in females 71%—i.e., there was less advanced atheroma in females in both periods, and a greater reduction in them (fig. 3).

TABLE III—PREVALENCE OF CORONARY ATHEROMA IN FEMALES AGED 35–70 AT NECROPSIES IN THE LONDON HOSPITAL

Age-group (yr.)	No. of cases									
	In 1908–13					In 1944–49				
	Early atheroma	Advanced atheroma	Not stated	Total	Proportion of total with advanced atheroma	Early atheroma	Advanced atheroma	Not stated	Total	Proportion of total with advanced atheroma
35–39	32	0	19	51	0%	25	0	2	27	0%
40–44	34	0	11	45	0%	24	0	1	25	0%
45–49	37	1	6	44	2%	24	0	5	29	0%
50–54	94	11	18	123	9%	34	0	3	37	0%
55–59	53	17	12	82	21%	32	1	3	36	3%
60–64	46	25	10	81	31%	41	4	2	47	9%
65–69	28	32	3	63	51%	20	6	0	26	23%
Total	324	86	79	489	Standard. 50–69 25·9%	200	11	16	227	Standard. 50–69 7·5%

See footnotes to table II.

DISCUSSION OF THESE FINDINGS

The trend shown in tables II and III was unexpected. If, as seems to be the case, there has been an increase of coronary heart-disease, explanation of this by an increase of coronary atheroma conjures up a picture of progressive hardening in the arteries of the population that would be alarming. However, the picture is not so self-evident in terms of the natural history of ischæmic heart-disease, or more generally in terms of the emerging knowledge of the nutritional relations of atheroma or of the falling death-rates of older people, that close proof is not required before it can be accepted. It was nevertheless surprising to find this suggestion of an actual decrease in atheroma, all the more because the same material showed the expected increase of the heart-disease. I have been unable to find any corroboration in the literature, though some senior pathologists have remarked in personal discussion on the apparent decrease of "pipe-stem" or "ossified" coronary arteries.

It is necessary now to scrutinise the present findings, seek out weaknesses, and, if possible, disprove the trends shown by the tables. Three possible sources of error at least need to be considered: (1) advanced atheroma may have been understated in 1944–49; (2) or overstated in 1908–13; and (3) the choice of methods may be unsound.

Experimental Error

This may be considered in relation to the first of these possibilities. It probably is (and was) small; calcification is easily recognised; omission to record it when observed is unlikely to have increased with the growing interest in coronary disease; in general the reports of 1944–49 are fuller than those of 1908–13, and the proportion "not stated" is smaller; as against the heterogeneity of the earlier reports, the later are by two—mostly by one—senior and increasingly experienced pathologists. In my own analysis of the records, methodology apart, little more than an ability to read—and a lot of patience—was needed.

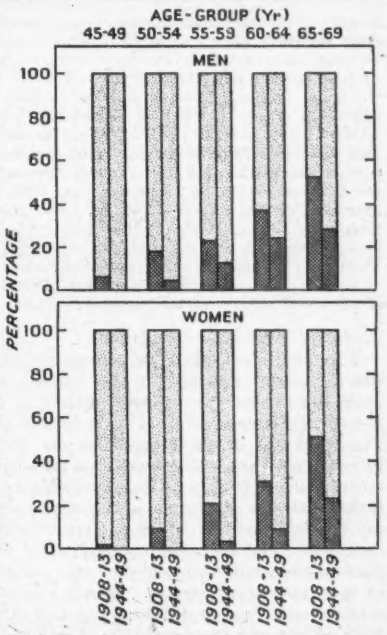

Fig. 3—Prevalence of advanced coronary atheroma at the age of 45-70 in men and in women (data from necropsies at the London Hospital) ; each hatched column shows percentage of age-group with advanced atheroma.

Seesaw Effect?

The total of advanced atheroma in 1908–13 may have been artificially inflated at the expense of "early" atheroma on the one hand; and of coronary heart-disease on the other. What has happened, the latter argument would run, is merely that coronary thrombosis and cardiac infarction were usually overlooked in 1908–13 and hence not reported. The underlying severe atheroma, however, *was* noticed and reported and, in consequence, included in the 1908–13 parts of tables II and III, whose totals of advanced atheroma were thus exaggerated. A review of the material along these lines should exclude the very obvious infarcts, and reasons have already been given why it is unlikely that coronary thrombosis was so overlooked. To deal thoroughly with this problem would take much arithmetic, a prospect that arouses little enthusiasm; but fortunately it is unnecessary. If the most extreme position is taken for the moment and all cases of table I are added to tables II and III, it can readily be seen that even then the total volume of advanced atheroma in 1944–49 would not equal that of 1908–13.[7] In the females such a redistribution would not make any material difference. Among the males the new "total" of advanced atheroma still remains short.

This "null hypothesis" in terms of complementary effects may be generalised. Theoretically it is possible that the total volume of severe atheroma in the population has remained the same, or has even increased, but that this is obscured because so many more with the atheroma are developing and

6. The reduction is unlikely to have occurred by chance. $P \leq 0{\cdot}002$ in males and 0·008 in females, on a method testing the weighted sum of the differences, a transformation having first been used to make the distribution more nearly normal.

7. Putting the matter simply, it may be said that about 50 male cases would be needed to raise the level of advanced atheroma in 1944–49 to that of 1908–13, and about 35 female. In fact there were in this Woods and Russell series 33 and 7 respectively. (Table I includes all the 1944–49 cases of coronary heart-disease, those examined by other pathologists also. Omission of the less definite cases from table I, as described, does not affect this conclusion.)

dying of ischæmic heart-disease, being transferred, as it were, from tables II and III to table I. This is unlikely to be true, because the order of decline of atheroma suggested by tables II and III is so much greater than any conceivable increase in the heart-disease. Thus, among males aged 60–64, advanced atheroma (table II) fell from about 37%, or 370 per 1000, to about 24%, or 240 per 1000—i.e., by about 130 per 1000. But *mortality* from coronary heart-disease in the general population at this age (fig. 1) even now is nothing like 130 per 1000—it may in fact be about 7 per 1000. Indeed the total mortality of males aged 60–64, from all causes, is less than a quarter of 130 per 1000. Another inquiry being carried out in this unit suggests that the *morbidity* is perhaps 10 or 12 per 1000. Therefore, if table II is at all representative and gives any kind of picture of changes that have taken place in the prevalence of advanced atheroma, such an explanation is inadequate.

Choice of Methods: Validation

The methods used in the present study may be wrong. An important element in the relation of atheroma to heart-disease may have been missed in the selection of the ratio of calcification to fatty lesions as the indicator. The thickness of the intimal lesions, for example, may be more relevant. Moreover, this definition is static and structural; but it was impracticable to devise a more functional one in terms of arterial narrowing, not to say efficiency of the coronary circulation and myocardial nutrition. The decrease in calcification may be a special phenomenon not exemplary of atheroma in general, and as such important, or not. It was impossible to inquire into the existence of different types of atheroma (Duguid 1949, White and Ferrero 1949). Further, the constitution of group C may be unsound.

A partial answer can be given to some of these points from the internal evidence. As a test of whether group C as a whole has no particular association with coronary atheroma, it was broken down into two: malignant disease, where there is least reason to suspect such an association, and the miscellaneous remainder. The results are of the same order in both subgroups, in both periods,[8] thus supporting the proposition that group C may be regarded as typical of the great mass of the population so far as the coronary arteries are concerned. As regards the reliability of the indicator of atheroma used, it may be said that the pattern of tables II and III was stable; it emerged after only a quarter or so of the work had been done and did not change. Moreover the regularity of the pattern, the progression with age in both sexes and in both periods, and the uniformly heavier incidence in males up to the age of 65 suggest that the criteria adopted discriminated real properties of the material and consistently separated the slight from the more severe atheroma. The rarity of stenosis and occlusion without it may be adduced in validation of the use of calcification as "indicator," and it may be added that ischæmic heart-disease in this series is associated with atheroma that has progressed to calcification in some part of the coronary system (though not necessarily in the lesions that form the basis of the thrombosis).

CORONARY ARTERIES IN HYPERTENSION

There is no doubt about the association of hypertension with coronary heart-disease (Friedberg 1949), and, though its association with coronary atheroma has possibly been overemphasised in the past (Harrison and Wood 1949), conceivably there may have been an increase in coronary atheroma restricted to, or mainly in, the hypertensive members of the population. In that event tables II and III, by omitting many of the cases with serious hypertension (these were excluded to group B), may be begging an important question. The simplest way to deal with this would be to add the appropriate number of cases with hypertension to tables II and III, and to calculate new inclusive rates of advanced atheroma; the "appropriate" number (since it is postulated that tables II and III are representative of the great mass of the population in respect of their coronary arteries) being that which would occur in a sample of the general population of the age structure of tables II and III. This aspect of the problem has already been discussed. The trouble is that, despite its importance, the prevalence of hypertension in the population is unknown, and it is impossible to estimate the appropriate number for the correction of tables II and III.

This discussion, however, may safely be cut short. In males the standardised rate (on the basis already described) of advanced coronary atheroma for deaths from hypertensive disease in group B was 40·3% in 1908–13 (59 cases) and 32·1% in 1944–49 (23 cases)—i.e., it does not seem that correction of table II for hypertension could have turned its downward secular trend up, or even kept it level. There were only 14 female cases in group B in 1944–49, so another expedient had to be adopted. Heart-weight may be used as a crude indicator of "incidental" hypertension in necropsy material, especially if deaths from valvular and pulmonary heart-diseases are excluded. The group C material (table III) was therefore reclassified by heart-weight into those above 11½ oz. and those of 11½ oz. or less, and the cases with the heavier hearts were added to the female group B data. Advanced atheroma (standardised) in this composite "hypertensive" group was 32·3% in 1908–13 (103 cases) and 14·3% in 1944–49 (37 cases). Again it does not seem that the reduction in the general prevalence of advanced atheroma in the population which is suggested by fig. 3 is invalidated by the inability to make due allowance for the prevalence of hypertension in the population.[9]

8. Standardised rate of advanced atheroma in deaths from malignant disease at 50–69 years of age:

	1908–13	*1944–49*
Males	26·3% (230 cases)	15·3% (137 cases)
Females	22·4% (136 cases)	4·9% (84 cases)

9. The proportion of heavier hearts was similar in both sexes and in both periods, in the range of about 12% at the age of 50–54 to about 35% at that of 65–69. In males also the standardised rate of advanced atheroma in the heavier hearts declined from 36·4% in 1908–13 (174 cases) to 21·1% in 1944–49 (59 cases). In males 13½ oz. was taken to be the critical heart-weight.

This sketchy treatment of hypertension and its relation to coronary disease is intended only to meet this very limited and specific problem. There is more advanced atheroma in those with hypertension, and the decrease was less in them. A simple sum, however, shows that in the males it would be necessary for the great majority of the adult population to have become seriously hypertensive before the volume of advanced atheroma in 1944–49 could reach the level of 1908–13 through this mechanism. Possibly there has been some increase of hypertension in recent years which may be related to the increase of coronary heart-disease; but, though hypertension may be as lethal as cancer or infection, it is impossible to estimate its prevalence during the past forty years. It would not be worth trying to draw any conclusions, in so chronic and multiform a disorder, from the numbers of cases over the years brought to necropsy, as was done in table I with a much simpler problem. The only community indicator available is mortality from intracranial vascular disease, and this has changed little during the period in which coronary mortality has risen so steeply (Registrar-General 1951–48). (It may, of course, be possible to study further the prevalence of hypertension in the population from a detailed consideration of heart-weight and arterial hypertrophy as found at necropsy.)

Incidentally these findings provide another validation of method and dispose of another obvious weakness in the present study—the allocation of cases to groups B and C. If we disregard for the moment the rights and wrongs of the ratios of the groups, the addition of all these group B cases to group C in 1944–49 would still leave the totals of advanced atheroma very short of those for group C alone in 1908–13.

Other Associated Conditions

Cases in which diabetes was recognised were also excluded to group B. The prevalence of diabetes, however, is so much smaller than that of coronary atheroma, in these necropsies as in the general population, that this relatively minor aspect of the problem may be safely ignored.[10] Similarly, none of the other conditions with hypercholesterolæmia, or the diseases possibly associated with coronary atheroma—e.g., Paget's disease and fatal arteriosclerosis elsewhere—is or was sufficiently common to need consideration in this type of community study.

CONCLUSION

Whatever the clinical situation, coronary atheroma was well recognised at the London Hospital before the first world war. The evidence here does not suggest that there has been any increase of atheroma—any progressive deterioration in the coronary arteries of the population during the past forty years. On the contrary there seems to be less of advanced coronary atheroma now than formerly. Since the decrease was seen in both the normotensive majority and the hypertensive minority of the population, the relative sizes of these is in the present connection unimportant.[11]

(To be concluded)

ASPIRATION TREATMENT OF PERFORATED ULCERS

A FURTHER REPORT

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OCCASIONALLY during the last half-century obtuse patients have refused operation for their perforated ulcer and have yet recovered. In 1935 Wangensteen advised against operation on gravely ill people whose admission to hospital had been delayed. For such cases he recommended continuous gastric tube drainage, to promote or to support natural closure of the perforation, and he and others since have reported on patients saved in this way. From time to time, at emergency operations, it is found that the perforation has been sealed by fibrinous adhesion to the liver or omentum, and, to justify the surgeon in staying his hand, the loose term "leaking perforation" has crept into the literature to include a group of cases in which leakage has in fact ceased. Sometimes, too, in routine operations on ulcers, upper abdominal adhesions round cellulose particles have borne witness to a past perforation which has healed without being recognised, though the patient, under cross-examination, may recall a particular and atypical bout of "ulcer" pain.

Thus it has been recognised, though tardily, that a perforation may close spontaneously. But the therapeutic prospects have been obscured by the outlook and training of the average surgeon in acute abdominal work. The dramatic nature of the case, the sudden pain, the conception of the gaping hole in the stomach, the satisfaction of closing it, the recognition by relatives and by authority that the surgeon has not shirked his duty but has taken the risk (!)—all these things have made it difficult for the young surgeon, to whose lot these cases mostly fall, to conceive any other course than immediate operation for all perforations whatever the hazards. Nevertheless, the fact is that a perforation will certainly close itself if the stomach is promptly emptied and kept empty, so that neither fluid nor gas passes through the aperture. Professor Wangensteen recognised this simple truth, as well as the enormous defensive and recuperative power of the peritoneum after contamination; but he confined its application to late cases.

It was not till 1939 that Mullen, of Seattle, applied Wangensteen's principle to early cases of frank perforation. Having treated 8 patients without a death, he cautiously addressed the Seattle Surgical Society on the subject, with the result that a further 19 were treated by his colleagues. Of these 19, 1 was moribund on admission and died, but 2 died who had been in good condition with recent perforations and who could have been expected to recover after operative treatment. There is no doubt that failure in these 2 cases was due to inadequate gastric decompression—a subject discussed later in this paper. Dr. Mullen, however, feared the indiscriminate application of a method subject to such errors, and abandoned it without publishing his work. No notice seems to have been taken of the fact that the total mortality—3 deaths in 27 cases—was actually below that of surgical treatment at Seattle at the time. In 1945 Bedford-Turner treated 6 cases of acute perforation by gastric suction without fatality, but he did not follow up this work after completing his resident appointment at the Royal Sussex County Hospital, Brighton.

THE KING GEORGE HOSPITAL EXPERIMENT

Seven years ago I began independently to try the method at King George Hospital, Ilford, for reasons which have already been explained (1946). At that time the general mortality of operation for perforated peptic ulcer lay between 12% and 20%. At York, Visick (1946) put it at 20%, and in Glasgow Illingworth et al. (1944) at 14%. The Radcliffe Infirmary 19%, Hackney Hospital 17%, King George Hospital 18%, and the London Hospital 17% were remarkably uniform results for Southern England in the period 1940–45. In the United States Luer (1949) quoted 18% for St. Louis City Hospital, in 1938–48, DeBakey and Odom gave 17% in a review for 1940, and Black and Blackford found 12% for 1945.

In our preliminary work at King George Hospital we treated 28 cases, with 4 deaths. Of the patients who died, one was moribund from the start, and another collapsed with a massive pulmonary embolism. A third died from the results of an ill-conceived intercurrent operation, and the fourth from re-perforation following inadequate gastric decompression. Nevertheless our results were better than previous surgical results at the hospital, and could obviously be improved by the lessons we had learnt. We therefore decided to continue with what was perhaps the first sustained attempt to work out on a hospital scale the risk, the complications, and the implications of a policy of treating perforated ulcers by aspiration instead of operation.

Object in View

We set ourselves to show that gastric aspiration could be relied on to close the perforation in the bulk of cases, and that, where it failed, recourse could still be made to operation without material increase of risk. Our intention was to avoid those deaths which followed the pulmonary, cardiovascular, and surgical complications of the operation itself, and which accounted for more than half the surgical case-mortality. Our target, an

10. The prevalence of diabetes among men, as judged from Ministry of Food data, is well under 1%, and among women somewhat higher but still less than 1% (Stocks 1949). Compare the prevalence of coronary atheroma (tables II and III).

11. It should be possible to repeat these observations elsewhere—e.g., on the contemporary prevalence of advanced atheroma. The warning must be given that historical study of atheroma is likely to be rewarding only where there has been routine description of the lesions over a long period (Willius et al. 1933). In view of the growing interest in coronary disease and the possibility of changing standards it is impossible to interpret series that do not record the condition of the arteries in all or a large proportion of necropsies, or which do not routinely describe the actual lesion sin them (see Levy et al. 1934).

easy one in 1946, has been greatly diminished by the remarkable fall in operative mortality in general, and for perforated ulcer in particular, since that time. The reasons for this are the general use of antibiotics, the expansion in the science of anæsthesia, and the newer techniques in abdominal wound closure and postoperative care. Thus, in Cincinnati, McElhinney and Holzer (1948) have reduced the operative mortality of perforated peptic ulcer from 21% to 11% and McElhinney (1949) reported only 4 deaths in his last 64 cases. In this country Avery Jones, Parsons, and White (1950) write of a fall in operative mortality from 27 to 4% in the last ten years; but their series of 490 cases included 36 patients (with 32 deaths) who were not operated upon, either because the perforation was not diagnosed, or because they were considered too ill.

Difficulties in Assessment

The difficulty of reaching sound conclusions is indicated in the last phrase; for the mortality from perforated ulcer under either method of treatment is influenced by many extraneous factors. Old people run more risk than the young, women more than men, gastric perforations more than duodenal, late cases more than early ones. If one adds the special circumstances affecting the practice of individual surgeons, it is clear that the excellent results of their personal operations cannot be generally applied, since they exclude the patients whom they thought too ill for operation as well as those they were not called to see. Even with hospital figures, a clear distinction must be made between operative mortality and total mortality. For example, I have quoted the figure of 17% operative mortality for perforated ulcer in the London Hospital for 1940–45. During that time there were also 11 patients too ill to be operated on, all of whom died; but their records are not included in the surgical mortality figure, which could therefore be misleading in loose argument. It is debatable whether Avery Jones and his colleagues make the practical problem of treatment easier by including also the undiagnosed cases demonstrated post mortem; but their work has done much to promote the necessary sense of perspective. It is evident that comparison of the results obtained by the conservative policy at King George Hospital with the results of the operative method elsewhere are admissible only if the latter include the whole practice of a hospital, night and day, treated by the entire staff. Even then, conclusions must be modified by geographical and social factors; for the results in a compact residential area, with excellent transport and general-practitioner services, will be better than those in a hospital less fortunately placed.

Preliminary Conclusions

A number of points are already clear from our preliminary observations in 1946 and the experience of other workers since that time. No cases should go untreated for lack of transport facilities; but aspiration on the spot is better than a long journey and delayed surgery. In hospital, any patient who has to wait for his operation—because he is in poor condition, or for any other reason—must have his stomach emptied and kept empty during the waiting period. Operation must not be performed where it would be attended by serious risk from advanced age or associated disease; all such patients could be treated by aspiration.

These conclusions apply to cases treated in unfavourable conditions. The object of the present study is to present for comparison the results of the aspiration method in conditions which were perfectly suitable for surgery. The question is not one of mortality alone. Fit young people nowadays run little risk to life from either method, and from this point of view there may be little to choose between the two. But into the scales of judgment must be thrown a certain incidence of morbidity and disability which are weighty considerations early in an active career. One may include such things as wound hernia, activation of latent phthisis, intestinal obstruction by bands or adhesions, and other sequelæ of the operation itself. This is by no means a negligible factor; for example, in the early tentative days of the King George Hospital experiment, some of the staff preferred to continue the practice of immediate operation on their cases. The small group of 7 operated cases which thus arose comprised 1 death, 3 uneventful recoveries, and 3 survivals with complications. The latter included a severe atelectasis and pneumonia in one case, and re-suture of a ruptured wound with ultimate hernia in another, while the third patient had to have a second operation to relieve intestinal obstruction due to an intestinal kink, and was left with an incisional hernia. Clearly it is but half the tale to record that 6 patients survived!

The deeper one delves into these complexities, the more obvious becomes the need for each hospital to have a policy, and for the results to be studied clinically as well as statistically. Two alternative policies are available—to operate on all cases that are not too risky and to aspirate the remainder, or to aspirate all suitable cases but be prepared to intervene surgically if the need arises. At King George Hospital we have adopted the second course, based on the following appreciation of the pathological process at work.

THEORETICAL CONSIDERATIONS

In the absence of treatment, death is ordinarily caused by absorption of toxins from the infected peritoneal fluid. In practice therefore the important clinical estimation to be made is the intensity of the toxic state, and it is useful to distinguish three degrees:

In the *first stage* infection has not yet taken place and there is therefore no toxicity. The question is merely one of closing the perforation in the best way. We prefer to keep the stomach empty by aspiration and allow it to close itself. This method avoids the side-effects and dangers of operation. Antibiotics may be given prophylactically with advantage but are not essential.

In the *second stage*, ordinarily at about twelve hours, infection is established and toxic absorption has commenced, but there is still time to deploy antibiosis to arrest the infection, and one can still rely on natural processes to eliminate the toxins—provided no reinfection occurs. Absence of reinfection can be ensured by keeping the stomach empty by aspiration, and where the patient is a serious surgical risk this may be the best course. However, excess of infective fluid renders the peritoneum less capable of the firm adhesion required to seal the perforation, and trouble may arise later from pocketing of fluid. In a healthy subject, therefore, operation to suture the perforation and to allow proper toilet of the peritoneal cavity may well provide smoother and safer convalescence.

In the *third stage*, ordinarily at twenty-four hours, the system is overwhelmed with toxins from the flooded peritoneal cavity. Our immediate concern is no longer to kill organisms or stop the perforation; the need is to arrest at once any further absorption of toxins by removing the fluid from the peritoneal cavity. The patient is necessarily too ill for full-scale operation, but the pelvis and renal pouches can be drained through small incisions under local anæsthesia, while reinfection from the perforation is prevented by continuous aspiration of the stomach.

Many factors influence the speed at which the peritoneal crisis develops—the size of the perforation, its relation to the pylorus, the nature and amount of the gastric content, and the kind of micro-organisms which predominate. The intensity of the pathological process, therefore, ranges widely: at one end of the scale is the small duodenal perforation in a healthy person with an empty stomach and good protective rigidity, while at

the other is the large gastric perforation in an elderly female or flabby alcoholic with a full stomach and a poor abdominal wall. The very late case is, therefore, not necessarily the very toxic case; and herein lies the explanation of the rare success of simple aspiration in the treatment of neglected cases, first described by Wangensteen. It was Illingworth, however, who first pointed out that an untreated patient alive three days after perforating had a rather better chance of survival than one admitted after twenty-four hours—a paradox in accord with this appreciation of the processes at work.

Nevertheless, in most cases the time factor is the most important consideration. Gastric aspiration is useful at all stages, but it will be noticed that the objective is different in early and late cases. In an early case aspiration is employed to promote prompt sealing of the perforation. It may do this in an infected case, too, but its object here is rather to prevent reinfection of the peritoneal cavity, whether the perforation closes at once or later. With effective aspiration the perforation becomes innocuous and can be discounted while undivided attention is given to the condition of the patient and the peritoneal cavity. (So far from gastric contents draining into the peritoneal cavity, the reverse is often seen in these patients with gross peritonitis, the gastric aspirate being at first identical in character with the fluid discharged from the abdominal drainage tubes.)

GENERAL MANAGEMENT OF CASES

The great majority of cases arriving at hospital are in the early non-toxic phase. These we have treated by the aspiration method outlined in my original paper, and they have made an uneventful recovery. Their progress is very carefully observed, especially in the first twelve hours, and we are prepared to open the abdomen if a steady rise in pulse-rate suggests a virulent infection, or throws doubt upon the diagnosis. By means of X rays we look for any increase of subdiaphragmatic gas, which would indicate failure of the perforation to close. We are on the watch for localised collections of fluid which might become infected and require evacuation. We think we have learnt most of the tricks of the small indwelling naso-œsophageal gastric tube: how it may be held up at the cardia and deceive the unwary by allowing the aspiration of a test drink; how it may kink itself in the stomach and prevent aspiration, but yet allow water to be injected down it as a spurious test of its patency. We have come to the conclusion that the only way to be sure that the gastric aspiration is what it seems to be is to employ radio-opaque tubes which will reveal their position on radiography. We are not content unless the position is correct and aspiration produces *some* fluid, however little, and can recover a test drink. Gas or fluid must be absent from the stomach, and the quantity of intraperitoneal air must be seen steadily to decrease as the days pass. It will be observed that X-ray control plays a large part in the management of the cases.

We have eschewed all attractive pieces of constant suction apparatus, which cannot report failure to the ward sister, and we have learnt the value of aspiration at regular intervals and the opportunities they provide for repeated observation of the patient. In lonely far-off places the doctor would have to be content with much less than this, and indeed the method can be reduced to simple terms by which the patient can himself aspirate his stomach. We have done this as a matter of interest at King George Hospital; but the best results are obtained only after the most careful instruction of the nursing staff, who have the fundamental responsibility of ensuring that the gastric aspiration is faultless. This presents no difficulty to an experienced ward sister, but great watchfulness is required at every stage, and the success of the treatment depends on the attention and enthusiasm devoted to it.

ERRORS OF DIAGNOSIS

Two perforations were not diagnosed. One patient with predominantly right-sided pain was operated on as an acute appendix, and a duodenal perforation was exposed and sutured. The other was treated conservatively as a case of cholecystitis. Radiography was undertaken for gall-stones, but revealed instead a tell-tale layer of gas between liver and diaphragm. Both these patients did well.

More important for my thesis are errors in the opposite sense—cases misdiagnosed as perforations. In my original paper I mentioned the recovery of a patient with acute cholecystitis who was thought to have a perforated ulcer and was treated by gastric aspiration. The importance of this was pointed out immediately by Professor Grey Turner (1946). "Let us accept" he said in effect, "that a patient with a perforated ulcer can be saved by this means without operation, and let us suppose that the method becomes widely applied. How many patients will there then be, wrongly diagnosed as perforations, who will lose their lives because the abdomen was not opened and the true cause of the emergency found and dealt with?" That was a serious criticism of the whole policy, and to estimate its gravity we have been careful to record all cases of erroneous diagnosis. At King George Hospital since 1946 our diagnosis of perforation has been correct in 73 cases and incorrect in 4, which I record in detail:

1. One patient was thought to have done very well with aspiration of the "perforation" until four weeks later when the truth was revealed by a second attack with jaundice! An uneventful cholecystectomy ensued.

2. A man of 63 with a known ulcer, admitted with acute pain, was aspirated for fifteen hours. Continuing pain and a rising pulse-rate led to operation which disclosed a perforated appendix. The patient did well.

3. A man of 40 with six hours' abdominal pain, and right-sided tenderness and rigidity, was subjected to gastric aspiration on a diagnosis of perforated ulcer. Rapid subsidence of abdominal pains and the appearance of signs at the right base soon demonstrated that he had a right basal pneumonia and pleurisy with referred pain. He did well, but it was fortunate that no operation had been performed.

4. The fourth patient, a rather ill man of 56, was admitted four hours after sudden abdominal pain. Gastric aspiration was instituted but was abandoned because the pulse-rate rose from 90 to 130 in the next two and a half hours. Operation thereupon revealed a fæcal peritonitis, spreading from the right flank, which was thought to be appendicular in origin. The patient lingered for thirty-six days on antibiotic therapy, with drainage of abdominal abscesses as they presented successively in the pelvis, the left flank, and under the diaphragm, until death supervened from exhaustion and toxæmia. Necropsy showed a plastic peritonitis with multiple pockets of pus and fistulæ to the colon. The appendix, stomach, and duodenum were normal, and it was considered that the initial fæcal peritonitis had arisen from perforation of the right colon, perhaps from a foreign body, perhaps through a diverticulum. Few patients recover from such a condition.

If we include the cases at King George Hospital before 1946, the facts may be summarised as follows. During seven years, in a 200-bed general hospital in a London suburb, 106 cases were diagnosed by the resident staff as perforated ulcers, and treated mostly by gastric aspiration in preference to operation. Of the 106 patients 5 were suffering from other diseases and 1 of them died. In this case the delay in operating occasioned by the misguided aspiration of the stomach for two and a half hours was a factor, though a small one, in the fatal issue. Against this may perhaps be set the case of basal pneumonia in which the period of aspiration provided an opportunity to correct the diagnosis, with

avoidance of operation. The possibility of clinical error cuts both ways and raises also the question of the number of patients wrongly diagnosed as perforations who lose their lives because the abdomen is opened too hastily. Gastric crises, coronary occlusion, dissecting aneurysm, basal pneumonia with pleurisy, and pancreatitis are all acute medical conditions for which operation may be mistakenly undertaken.

However this may be, the broad conclusion to be drawn from our experience seems to be that if the policy of aspirating perforated ulcers justifies itself on its merits, the risk of accepting it on grounds of possible error of diagnosis is not substantial.

The discussion of errors of diagnosis would not be complete without mention of Sister Miller's sign. Sister Miller is in charge of the casualty department of King George Hospital, and she has observed that those patients do well whose pain is rapidly relieved by the initial evacuation of the stomach in her department. We have learnt to reconsider the diagnosis very carefully when Sister Miller is not happy about a case.

RESULTS OF TREATMENT

Cases with Respiratory Infections

Of the 73 cases of actual perforation admitted to the hospital in 1946–50, 8 were associated with acute respiratory disease, and 4 of these showed radiological opacity in the lung fields on admission. It is my impression, and it may be a fact, that the incidence of perforated ulcer rises during epidemics of influenza or coryza. Certainly patients with quiescent ulcers tend to relapse if they get a cold in the head, and it is probable that acute ulcers also arise in patients with coryza and that a few of them proceed at once to perforation.

Recovery from both perforation and respiratory infection was uneventful in 6 cases, though 1 of the patients was found to be tuberculous and was later referred to sanatorium. A 7th case did well after drainage of an empyema. The 8th patient actually recovered from his perforation only to die of his lung condition.

The perforation occurred two days after the onset of a diffuse bronchopneumonia. The radiograph showed bilateral basal consolidation of the lungs as well as air underneath the diaphragm. An elderly man, he improved under treatment, collapsed with a melæna, and rallied with transfusion. A subphrenic collection of fluid was thought to be a respiratory handicap and was drained. The abdomen was now soft and the patient was on milk feeds; but cyanosis deepened, dyspnœa increased, and he died of right heart-failure after nine days. Necropsy showed a firmly closed duodenal perforation, fibrinous exudate below the diaphragm, but no peritonitis. Death was due to myocardial degeneration, adhesive pericarditis, and consolidation of both lungs. Clearly the aspiration treatment had given him the best chance of recovery.

None of these 8 patients with respiratory infections could have done better with operation, and some of them might have done worse.

Other Associated Disease

Other sporadic cases of associated disease to which the same comment may apply are a uræmic man of 65 whose bladder was enlarged to the umbilicus, and a man aged 77 with coronary thrombosis whose perforation was confirmed by intraperitoneal gas. Both these patients recovered. In 2 instances the perforation occurred in a carcinoma of the stomach.

One of these patients, a woman, recovered from the perforation but developed ascites during convalescence. Exploration showed a gastric cancer covered with organising fibrin and widespread peritoneal carcinomatosis. The other cancer patient was an old man of 81 with a twenty-hour perforation and gross peritonitis. He was operated upon at once, appeared to recover from the infection, but died of exhaustion at the end of a week.

Cases Operated Upon

Surgical intervention of major or minor degree was undertaken in 9 cases. In 2 the operation was immediate. The first patient was the aged man just mentioned. The second was a diabetic of 56 with a forty-eight-hour perforation and gross peritonitis. This desperately ill man was treated by gastric aspiration and the insertion under local anæsthesia of drains into the right and left renal pouches and into the pelvis. He died without material improvement two days later. Necropsy showed an unsealed gastric perforation and total peritonitis.

A man of 60 was operated upon after three hours' aspiration because he had a rising pulse-rate and because he had perforated while eating a large meal. His stomach was found to have been effectively emptied by the large gastric tube, and his lesser curve gastric perforation was already sealed by a delicate fibrin layer under the liver. There was little peritoneal fluid and we came to the conclusion that the rise in pulse-rate had been emotional in origin. He made an uninterrupted recovery.

Three minor operations were undertaken late in convalescence in order to drain local collections of fluid from the right renal pouch or subphrenic space. Through a one-inch incision under the right ribs a finger was inserted and gently advanced, separating the tissue planes until the fluid was reached. A tube was then inserted and the skin closed round it. This minor procedure was usually undertaken because of the development of mild fever, which might indicate early infection of the fluid collection. There were other cases in which an area of persisting tenderness after the subsidence of the main peritonism suggested that a collection of fluid might be present, but these all resolved spontaneously. It is likely that transient encystment of small collections of sterile fluid is a regular feature in the resolution of the peritoneal disturbance.

Air-swallowers

The remaining operations were on patients afflicted with air-swallowing, either as an established habit or perhaps induced by the presence of the indwelling naso-œsophageal catheter. My first contact with this complication was in a case at the London Hospital. (This case and others which occurred sporadically elsewhere than at King George Hospital are not included in this series because their treatment was not undertaken as a matter of hospital policy. I have felt it important to keep the present experiment absolutely controlled at King George Hospital until the issue is clear.)

The patient was a man of 50, with a six-hour duodenal perforation and coincident acute bronchitis. Treated with penicillin and by the aspiration régime he did well constitutionally. His temperature and respiration-rate subsided and he talked and smiled and read the newspaper. His indwelling gastric tube produced small quantities of clear juice; but he astonished everyone with the enormous distension of his abdomen. On the third day he was taken to the theatre and a small incision was made below the right ribs, whereupon his pneumoperitoneum collapsed like a pricked balloon. Coils of intestine picked out of the abdomen at random for inspection showed a glistening peritoneum of normal pink colour. No further exploration was made and the patient returned to bed. The next day his abdomen was distended again, though his excellent condition was unchanged. Pondering this conundrum at the bedside, I observed the man swallow a gulp of air, and it was clear that the swallowed air was passing from the stomach through an unsealed perforation into the peritoneal cavity. It appeared that he could swallow air faster than it could be aspirated, and that the surface tension of the bubbles in the narrow lumen of the naso-œsophageal catheter was sufficient to prevent escape of gas between aspirations. The small tube was therefore replaced by a stomach-tube the size of a finger, which was left in place for twenty-four hours. The distension subsided, the perforation sealed, and the patient made a good recovery. The site of the ulcer and its adhesions to the liver were subsequently confirmed at operation for persisting ulcer symptoms.

Importance of X-ray Control

This was the first occasion on which I met a perforation which failed to close with small-tube aspiration. It demonstrated in a remarkable way the innocuous character of the unsealed perforation, despite the continued escape of air, provided all *fluid* is removed from the stomach so that none is available to pass the gap into the peritoneal cavity. Manifestly, however, such a situation is unstable and dangerous, since gastric aspiration is never absolutely reliable, as events at King George Hospital show:

A man of 53, with a four-hour duodenal perforation was treated in the usual way and for three days appeared to do well. His condition then deteriorated, with pyrexia and a slowly rising pulse-rate, while the gastric aspirate became dark and copious. I was asked to see him on the seventh day, when he was quite ill. Reviewing the radiographs of the abdomen, it was found that pictures taken on the third day showed more gas under the diaphragm than the film taken on the first day. The significance of this had not been appreciated. The patient had swallowed air, a fact confirmed by the ward sister; his perforation had been kept open by the gas, and peritonitis had developed apparently by the fourth day. An operation was carried out to drain the peritoneal cavity, but the patient died some hours later.

The lesson did not sink in, and we are ashamed to report that soon afterwards an almost identical series of events occurred in another patient, which also ended fatally.

The strict rule was therefore made that every patient treated by aspiration must be radiographed on the second day, and that if the film showed more gas under the diaphragm than was seen in the radiograph taken on admission, the abdomen was to be opened at once. This occurred in the very next patient, again an air-swallower with a duodenal perforation. The second day showed an increase of gas below the diaphragm, operation was performed after thirty hours, an unsealed perforation was sutured, the pelvis was drained, and the patient made a satisfactory recovery. One other patient was operated on for rapidly increasing gas beneath the diaphragm associated with a rising pulse after four hours' aspiration. Again an unsealed perforation was sutured and the patient did well.

I have recorded this episode in detail because of its unexpected nature. It remains to be seen to what extent the swallowing of air constitutes a danger now that we are aware of it. So far it appears that the risk from escape of air through an unsealed perforation is not great for twenty-four to forty-eight hours, provided the fluid contents of the stomach are removed by the indwelling tube. But once the state of affairs has been recognised, operation should be undertaken immediately. It is worth noting that the two fatal cases described to me by Dr. Mullen are very like our air-swallowers. One of them was found to have an increase of gas under the diaphragm some days after the onset and died on the ninth day. The evidence in the other case is not complete but is rather similar.

"Shock"

Another patient died from a cause which has remained obscure.

A woman of 32, rather frail and undernourished, was admitted with a two-hour perforation, a pulse-rate of 120, and a cold clammy skin. She was treated in the usual way by aspiration and penicillin, but developed a rapidly progressive circulatory collapse, with a profound fall in blood-pressure, and died in twelve hours. All that was found post mortem was a prepyloric perforation completely closed by fibrinous attachment to the liver and a minimal peritoneal reaction with a few ounces of turbid fluid. Unfortunately the fluid was not cultured, but there was no suggestion in the appearances that virulent infection had taken place.

A similar clinical picture with a more fortunate ending was seen later in the series, again a woman in collapse with a blood-pressure of 90/56 six hours after a perforation. The abdominal condition responded to the aspiration, but she lay for a long time in a feeble state and was not well enough to go home till five weeks had passed. Desmond (1950) in London, McEllinhey and Holzer (1948) in Cincinnati, and Luer (1949) in St. Louis have all described cases like these. Though the perforation is recent, a shock-like state develops rapidly and inexorably; the patient fails to respond to resuscitation and dies in a short time, having given no opportunity for surgical intervention. Whatever the explanation, it is clear that in our fatal case operation would have achieved nothing, since the perforation was sealed and there was little fluid to remove from the peritoneal cavity.

Fatal Cases

There is 1 other fatal case to mention—an old man of 81 with a three-day perforation who died within twenty-four hours. The total of 7 deaths in the series of 73 cases may thus be recapitulated as follows:

Two air-swallowers: peritonitis.
One "shock."
One bronchopneumonia: pericarditis (perforation intercurrent and recovered from).
Three perforations over 24 hours:
Diabetic 48-hour perforation;
Senile 72-hour perforation;
Senile 30-hour perforated carcinoma.

The development of the conservative method must accept responsibility for the deaths of the air-swallowers, but clearly the others could not have benefited in any way from major surgery even had this been possible.

Successful Cases

When we have been depressed by our 2 mistakes we have been borne up by the thought of the number of gravely ill patients among the 65 survivors whose chance of life has not been prejudiced by the additional burden of an operation. If in writing this account, I have dealt at length with our problems and failures, it is because more can be learnt from them at this stage than from inadequate statistics. But I should not do justice to my colleagues and assistants if I were to leave the impression that we have been indulging in a sort of clinical tight-rope walk with the patient's life in suspense. On the contrary, in a young healthy person nothing could be more uneventful than a typical perforation treated by aspiration. The patient is put to bed having had his stomach emptied promptly on arrival at hospital and being already easier with his morphine. In six hours he says that his pain is better; next day he is sore but can move about; the day after that his tube is out and he is on medical treatment just as if he had been admitted with a non-perforating acute extension of the ulcer. The safeguards and examinations described are carefully practised, but in the main they yield quite negative results. Indeed, my chief anxiety these last six years has been lest the routine nature of these cases should lull the staff into an easement of the vigilance so necessary to detect at once the case that goes wrong. I think that might be a fair comment on the episode of the air-swallowing.

EXPERIENCE OF OTHERS

From personal contacts and a study of the literature I have been able to collect the following 555 cases from the United States, France, Holland, and England.

	Cases	*Deaths*
Mullen (1950), Seattle	27	3
Bedford-Turner (1945), Brighton	6	—
Lane (1950), Baltimore	79	1
Visick (1946), York	14	3
Seeley et al. (1950), U.S. Army	83	4
Quénu (1950), Paris	17	1
Iselin et al. (1950), Nanterre	19	1
Swynghedaun (see Quénu 1950), Lille	8	—
Truscott and Withycombe (1950), Cambridge	20	3
Gill and Jenkins (1950), Guildford	24	4
Stead (1951), London	46	5
Bloem (1950), The Hague	6	1
Dodd (1950), London	10	—
Bullough (1950), Manchester	95	7
Hermon Taylor (1946), London	28	4
Hermon Taylor (1951), London	73	7
	555	44

It will be seen that 555 patients survived and 44 died. Of the deaths 22 were in cases known to be hopeless on admission and too ill for operation (Visick 2, Gill and Jenkins 3, Mullen 1, Bloem 1, Stead 4, Seeley et al. 3, Hermon Taylor 4, Bullough 4). There may have been others. In 6 more cases death is known to have resulted from a cause unconnected with the choice of treatment—namely, pulmonary embolism, delirium tremens, pneumonia, shock. Manifestly, whatever the ultimate therapeutic pattern, the hard core of inevitable deaths will persist. The remaining 16 deaths represent the first returns of a new method, creditable themselves, and capable of improvement as the special problems that arise are recognised and dealt with.

What is advocated, and what is reported, in this article is not the treatment of all perforations by aspiration regardless of circumstances. There is no question of comparing a consecutive series of aspiration cases with a similar series operated on. What is recommended is that the bulk of cases should be treated by aspiration as a policy, with operation reserved for the failures such as air-swallowers, patients who cannot be intubated or are uncontrollable, cases with severe initial peritoneal contamination, and possibly others.

SUMMARY

101 cases of perforated ulcer have now been treated by the aspiration method at King George Hospital, Ilford. This paper analyses the second group of 73 cases.

Of these 73 patients, 2 were lost through air-swallowing; the steps required to deal with this complication are described. The other 5 fatal cases were not related to the method of treatment. Several patients were saved by aspiration who would have been serious operation risks.

With 1 doubtful exception, no patient admitted as a surgical emergency lost his life because it was the policy to aspirate such of them as were diagnosed as perforated ulcers.

Perforation of an ulcer is a complication which has lost its desperate character. The protection afforded to the patient by maintained emptiness of the stomach allows time for each case to be considered on its merits. No case should blindly be subjected to immediate operation.

The first step in the treatment of any perforated ulcer under any circumstances is prompt evacuation of the stomach. In the further treatment of most perforations, continued aspiration of the stomach is the method of choice, operation being reserved for special circumstances.

I wish to record my appreciation of the judgment and skill of Mr. C. P. Allen, F.R.C.S., and Mr. J. F. R. Bentley, F.R.C.S., in treating these patients. To my house-surgeons and to the sisters and nurses of King George Hospital, whose enthusiasm for this method of treatment has been the largest factor in its success, I should like to express my deep gratitude.

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CONSERVATIVE TREATMENT OF PERFORATED PEPTIC ULCER

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THE evolution and technique of the conservative treatment of perforated peptic ulcer have been described by Hermon Taylor (1946), and he has now set out his results up to date (Taylor 1951).

The conservative method has been used at Hackney Hospital in selected cases during the past two years. The 76 consecutive cases described here were not segregated, and were treated by the two general surgical firms without special facilities. The cases are classified, according to treatment, in table I.

Untreated Cases

3 patients were admitted moribund. They were aged 61, 89, and 78. Treatment was clearly impossible, and they died after 15 minutes, 4 hours, and 8 hours. The diagnosis was confirmed at autopsy. 2 further cases were not diagnosed before death.

Conservative Treatment

During the greater part of the period under review, both surgical firms treated all cases conservatively unless certain indications for operation were present. Of altogether 50 patients treated conservatively, 38 were fit for operation and 12 were unfit for operation.

PATIENTS FIT FOR OPERATION

Diagnosis.—In 32 of the 38 patients who, though fit for operation, were treated conservatively, the diagnosis of perforation was confirmed by the radiological demonstration of gas under the diaphragm. In 2 of these 32, subsequent radiological examination showed no evidence of ulcer; on the basis of probability these cases are classified as duodenal ulcers. In the remaining 6 there was conclusive clinical evidence of perforation, but free gas was not demonstrated; each, however, had radiological evidence of peptic ulcer and 4 subsequently underwent partial gastrectomy; at operation the appearances were consistent with a recent perforation.

Management.—One firm gave penicillin only, and the other used penicillin and sulphamerazine. The results were not significantly different. Before radiological examination the patient's stomach was aspirated, to check the diagnosis and the position of the Ryle's tube and the efficacy of the aspiration. The radiograph sometimes revealed free fluid in the peritoneal cavity, and this was an indication for particularly close observation. Patients were reviewed 4–6 hours after treatment was begun. The initial dose of morphine did not mask the

TABLE I—TREATMENT OF 76 CONSECUTIVE CASES OF PERFORATED PEPTIC ULCER

Treatment	No. of patients	No. of deaths
Nil:		
Moribund on admission	3	3
Undiagnosed antemortem	2	2
	5	5
Conservative:		
Fit for operation—		
Gastric ulcer	3	nil
Duodenal ulcer	35	1
Unfit for operation—		
Gastric ulcer	3	3
Duodenal ulcer	9	1
	50	5
Operative	21	2
Total	76	12

pain in those whose response to aspiration was unsatisfactory; and such patients were operated on within 6 hours of admission. In successful cases repeated doses of morphine were usually unnecessary.

No rules can be laid down for the duration of aspiration and the time for starting feeds. The period of rest in bed, and the length of stay in hospital (average 19 days) were the same as in uncomplicated operation cases; and any time saved by the conservative method was due to the absence of complications.

Complications.—Freedom from complications is recognised as one of the chief advantages of the conservative method. In this group the most common complication was thrombophlebitis. No serious pulmonary complication was seen. There was 1 case of progressive pneumoperitoneum.

Case 1.—A man, aged 61, perforated less than 1 hour before admission. After 48 hours the abdomen was tense and tympanitic although the general condition was satisfactory and flatus had been passed. Radiological examination showed gross pneumoperitoneum with no distension of the gut. Through a 2 in. incision in the midline, under local anæsthesia, the abdomen was deflated. There was a small quantity of turbid free fluid, and matted coils of small gut were seen. The fluid was reported sterile. On the day after operation the abdomen again became tense and radiological examination showed that the gut was distended. The ileus eventually subsided and the patient recovered. Subsequent radiological examination after a barium meal showed a deformed duodenal cap and a normal small gut.

Since the distension was progressive, the perforation either remained unsealed or re-opened; but the source of the free gas is unknown. If swallowed, the air should have been removed from the stomach by aspiration, and the radiograph does not show gas in the stomach. There was, however, gas in the small intestine, and it is perhaps more probable that this was the source of the increasing quantity of gas in the peritoneal cavity. Whatever the source of the free gas, this patient owes his recovery to the resistance of his peritoneum rather than to the efficacy of the treatment.

Mortality.—There was 1 death in this group.

Case 2.—A man, aged 40, had suffered from indigestion for 15 years; radiological examination at another hospital was negative. He perforated 4 hours before admission. He was a moderately well-nourished man in severe pain, with cold extremities. Pulse-rate 84 per min.; blood-pressure (B.P.) 130/70 mm. Hg. Heart and lungs clear. Abdomen: board-like rigidity in epigastrium and down right side; liver dullness diminished. No tenderness on rectal examination. Radiological examination: "considerable quantity of gas under diaphragm on both sides."

Conservative treatment was instituted. After 8 hours the abdomen was softer, and 4 hours later the patient was apparently comfortable. 24 hours after admission his general condition was satisfactory. The rigidity had greatly diminished, and there was tenderness only in the epigastrium; there was, however, obvious distension. 48 hours after admission aspiration was discontinued and feeds by mouth started.

Progress appeared satisfactory until the 5th day when the abdomen became more distended and gastric aspiration produced 47 oz. of dark bile-stained fluid in 24 hours. The bowels were open on the 6th day, but the distension was not appreciably reduced. The patient became confused and had hallucinations, and the peripheral circulation failed. He died on the 7th day after admission. Necropsy report: "general peritonitis; unsealed perforated duodenal ulcer." The ulcer was chronic, and involved the anterior and superior aspect of the first part of the duodenum. The peritoneal cavity contained a quantity of purulent fluid.

In this case conservative treatment failed, and there had been no contra-indication to operation. The early progress was typical of a successful case and suggested that the ulcer had become sealed. Possibly aspiration was stopped too soon and distension re-opened the perforation.

Comment.—In this group of 38 patients sealing of the perforation failed twice, although only 1 patient died. Until the cause of these failures is known, and shown to be avoidable, there must be some anxiety attached to the use of the method; for when it was obvious that the perforation had not remained sealed it was too late for operative treatment effectively to control infection, and the issue depended entirely on the patient's resistance. This failure-rate in a large series of early operable cases might condemn the method despite its advantages to the majority of patients.

TABLE II—DATA ON 12 CASES UNFIT FOR OPERATION AND TREATED CONSERVATIVELY

Case no.	Age (years)	Site of ulcer	Hours after perforation	Associated conditions	Result	Remarks
6	44	S	6	—	Died after 10 days	Peripheral circulatory failure on admission
7	77	D	4	—	Died after 30 days	..
8	67	S	3	Hæmorrhage; bronchitis	Died after 36 hrs	..
9	60	S	24–48	Hypertension; emphysema	Died after 30 hrs	Failed intubation
10	71	D	24 +	—	Recovered	Dehydrated; circulatory failure on admission
11	54	D	12–24	—	,,	Dehydrated
12	64	D	1	Recent massive hæmorrhage	,,	Perforated in ward while under treatment for hæmatemesis
13	71	D	5	Prostatic obstruction	,,	..
14	74	D	12	Bronchitis	,,	..
15	46	D	6	Active pulmonary tuberculosis	,,	..
16	62	D	9	Inop. rectal carcinoma	,,	..
17	63	D	24 +	—	,,	..

D = duodenum. S = stomach.

PATIENTS UNFIT FOR OPERATION

Of the 50 patients treated conservatively, 12 were regarded as unfit for operation either on account of the effects of the perforation, or on account of associated disease (table II). The group is of interest because many surgeons consider that conservative treatment should be limited to such cases.

Diagnosis.—Of the 12 patients in this group, the diagnosis was confirmed at autopsy in 4. Of the survivors 3 had free gas and free fluid under the diaphragm and required peritoneal drainage, while 5 had no radiological abnormality, but at subsequent operation the appearances suggested a recent perforation; in 1 of these there was pus surrounding the duodenal ulcer.

Management.—The management was modified according to the condition of the patient. 5 (with normal radiological appearances) progressed uneventfully on conservative treatment. The 3 cases requiring drainage are summarised below.

Case 3.—A man, aged 71, who had perforated over 24 hours previously, rather unexpectedly responded to aspiration and rehydration. After 48 hours he had a grossly distended silent abdomen with an obvious collection of free fluid in the peritoneal cavity. Under local anæsthesia a small incision was made below the right costal margin, and aspiration produced 80 oz. of clear green fluid, which was reported sterile. Later, a pelvic abscess developed, which drained spontaneously per rectum. The patient was ultimately discharged.

Case 4.—A woman, aged 54, having perforated about 17 hours previously, was dehydrated and the abdomen was grossly distended. After routine treatment a localised

collection of turbid fluid (reported sterile) was aspirated from the right hypochrondrium under local anæsthesia. The subsequent course was uneventful.

Case 5.—A man, aged 63, admitted over 24 hours after perforation with obvious peritonitis, was treated conservatively and developed a right subphrenic abscess which was drained during the 2nd week. The further course was uneventful.

In cases 3 and 4 the initial conservative treatment was followed by a trivial operation; a formal laparotomy and suture under general anæsthesia must have involved a greater risk. In both, the removal of the fluid not only reduced the risk of infection but also appeared to relieve the ileus.

Mortality.—Of the 4 deaths in this group, 1 was probably avoidable though in this case the gastric perforation was of a type in which the postoperative mortality is high.

Case 6.—A man, aged 44, had 20 years' history of indigestion, and had been invalided from the Army on account of *duodenal* ulcer. 24 hours of anorexia and pain was followed by perforation 4 hours before admission. The patient was profoundly shocked; pulse-rate 120 per min., poor volume. Abdomen: generalised board-like rigidity. The stomach was aspirated and intravenous saline and dextrose commenced. After 9 hours there was no improvement; B.P. 76/60. 4 pints of plasma were given, with improvement in the peripheral circulation; but it was not until 24 hours after admission that the B.P. rose to 110/75. Treatment was continued as for general peritonitis. Although distension was relieved and the bowels became active the patient's condition deteriorated progressively. Bronchopneumonia was the immediate cause of death. Autopsy report: "Perforated *gastric* ulcer, general peritonitis, bronchopneumonia."

The patient was so shocked on admission that plasma was indicated in the first instance. However, the response, though slow, was complete and the circulation was restored. Aspiration was begun immediately and failed to prevent or control purulent peritonitis. This type of case, which is of considerable importance, will be discussed further.

The remaining 3 deaths were, in my opinion, unavoidable; but as others may disagree the essential features are described.

Case 7.—A man, aged 77, had perforated 4 hours before admission; site of ulcer unknown. He was a pale, frail-looking old man with a dry tongue and cold extremities. Pulse-rate 96 per min., B.P. 200/100. Abdomen: generalised board-like rigidity. With routine conservative treatment his condition improved and the abdomen became soft; bowel function returned. Radiological examination on the 3rd day showed gas and a fluid level under the right diaphragm. This fluid became infected and a subphrenic abscess formed, with a right pleural effusion and bronchopneumonia in the right lower lobe. Gross œdema was present over the sacrum and lower ribs. The patient's condition deteriorated, and he died on the 30th day after admission. Autopsy showed perforation of a duodenal ulcer, and confirmed the other clinical findings.

Case 8.—A man, aged 67, was unable to give a history, which was obtained from his wife. For 10 years he had had "bronchitis," following appendicitis and peritonitis. He was always poorly, with occasional epigastric pain relieved by powder. 4 days before admission he had severe abdominal pain with watery vomits. 3 days before admission he had melæna, with nine stools in 24 hours, and became very pale and ill. He perforated 3 hours before admission. On admission he was pale and collapsed. Pulse-rate 120 per min., B.P. 120/60. Heart enlarged; obvious dyspnœa and bronchospasm. Abdomen rigid. Gastric aspiration produced chocolate-coloured fluid tinged with red. Blood-transfusion was commenced. 6 hours after admission the patient collapsed and became comatose; B.P. 72/42. He never regained consciousness although the circulation improved and the B.P. rose to 115/70. He died 30 hours after admission. Autopsy report: "Perforated gastric ulcer, fibrinopurulent peritonitis, bronchopneumonia."

Case 9.—A man, aged 60, had for 3 months had substernal pain with loss of weight. 27 hours before admission he began to have severe epigastric pain, which was unrelieved by morphine. He was extremely ill, with dry and brown tongue and scarcely palpable pulse; B.P. 118/80. Lungs: crepitations at both bases. Abdomen rigid. Radiological examination showed gas under diaphragm. In this case all attempts to pass a Ryle's tube failed. Intravenous plasma was given without improvement in his general condition, and operation was not considered justifiable. The patient died after 36 hours. Autopsy showed fibrinopurulent peritonitis, and two perforated chronic gastric ulcers, one of which was subjacent to the cardia; fibrous scar in hypertrophied myocardium. The close proximity of the ulcer to the cardia may have explained the failure to pass the tube, which was a unique experience in this series.

In these cases it was believed that there was no alternative to conservative treatment, although in case 5 survival for a month in spite of a subphrenic abscess may suggest that in the first instance the patient was a reasonable operative risk.

Cases Treated By Operation

In my opinion the reported results did not justify conservative treatment of a consecutive series of cases. A "safety-first" policy was adopted, and certain indications for operative treatment were recognised (table III).

FAILURE OF CONSERVATIVE TREATMENT

When conservative treatment is succeeding aspiration of the stomach greatly relieves the pain; and within a few hours the abdominal rigidity diminishes in extent and degree, receding from the left to the right iliac fossa, and then up the right side to the epigastrium. The patient's colour improves, and his agonised expression changes to one of resignation, if not of contentment.

TABLE III—ANALYSIS OF 21 CASES OF PERFORATION TREATED SURGICALLY

Reason for operating	No. of patients	No. of deaths
Failed conservative treatment	4	nil
Diagnosis in doubt	6	1
Inexperience of conservative method ..	3	1
Gross pyloric obstruction	1	nil
Routine	7	nil
Total	21	2

The indications for abandoning the conservative treatment were: (1) persistent or recurrent severe pain, and (2) extension of the area of tenderness and rigidity. These are more useful indicators than the pulse and temperature, significant changes in which usually lag considerably behind local pathological changes. 4 patients were operated on because progress under conservative treatment was unsatisfactory. In 2 cases the perforation appeared to be unsealed at operation. In all, the postoperative course was uneventful.

DIAGNOSIS IN DOUBT

6 patients were operated on because the diagnosis remained in doubt. Acute appendicitis was the alternative diagnosis in 4. In the 5th, a woman, aged 81, perforated diverticulum was regarded as the more likely diagnosis; but it was obvious on opening the abdomen that the free fluid came from the stomach or duodenum. As a lower abdominal incision had been made it was decided to close the wound and treat the perforation conservatively rather than prolong the operation. The further course was uneventful.

Case 18.—The 6th patient was a man, aged 84, with a vague history and obvious general peritonitis. His general condition was thought to be fair. The diagnosis was in doubt, and laparotomy was decided on. Before the peritoneum was opened the patient died. Autopsy report: "Perforated duodenal ulcer; general peritonitis."

It is not claimed that this patient would have done well on conservative treatment.

INEXPERIENCE OF CONSERVATIVE METHOD

Assistants with no experience of the conservative method were instructed to operate on cases of perforated ulcer when advice was not available. This occurred 3 times, including the first 2 cases of the series; 1 patient died.

Case 19.—A man, aged 54, had perforated 6 hours previously. His general condition was satisfactory; there were classical signs of perforation. The induction of anæsthesia by a casualty officer occupied 40 minutes, owing to considerable difficulty with intubation, and relaxation was unsatisfactory throughout the operation. The perforation was sutured and the fluid aspirated from the peritoneal cavity. The postoperative course was stormy, and the patient died on the 10th day. Autopsy report: "Bilateral pulmonary collapse with bilateral bronchopneumonia." No purulent peritonitis or ileus present.

In this case conservative treatment would probably have been successful. Conservative treatment by an inexperienced surgeon is probably safer than operative treatment with an inexperienced anæsthetist.

PYLORIC OBSTRUCTION

In 1 case perforation followed 2 weeks of frequent projectile vomiting, which had resulted in dehydration and emaciation. The reasons for deciding on operative treatment, after rapid rehydration, were: (1) his condition had undermined his peritoneal resistance; (2) the escaping fluid was likely to be heavily infected; and (3) it was uncertain whether gastric aspiration would successfully control ileus in the presence of gross pyloric stenosis. At operation the pylorus was grossly stenosed; the perforation was sutured, but gastro-enterostomy was not performed. For the first few days after operation there was considerable gastric residue without bile, but when further operation was being seriously considered bile appeared in the aspirate. His subsequent progress was slow, but on discharge from hospital he had gained weight and felt well enough to refuse further surgical treatment.

ROUTINE OPERATION

One surgical firm adopted the conservative method some months after the series commenced, and the 7 "routine" cases are included only because they occurred during the period under review. As far as is known, there was no contra-indication to conservative treatment in these cases.

Results

The mortality in the whole series was 15·8%; excluding the 5 untreated patients, the mortality is 9·7%. This result compares favourably with the mortality of 17% in a series of 80 cases operated on at Hackney Hospital between October, 1945, and October, 1948. In these two series the patients came from the same community and were treated under similar conditions. The mortality of the 50 patients treated conservatively was 10%.

The results in cases of duodenal ulcer were:

Treatment	*No. of patients*	*No. of deaths*	*Mortality (%)*
Conservative	44	2	4·5
Operative	19	2	10·5
Total	63	4	6·3

Thus of the 59 survivors 42 (71%), including 9 complicated cases, have been spared a general anæsthetic and formal laparotomy with their associated discomforts and complications. Of the 4 deaths, 2 must be regarded as avoidable; 1 was treated conservatively (case 2), and the other by operation (case 18).

The results for gastric ulcer were:

Treatment	*No. of cases*	*No. of deaths*
Conservative	6	3
Operative	2	nil
	8	3

Of the 3 deaths in cases treated conservatively, 1 (case 6) was due to failure of the method or its application, and 2 (cases 7 and 8) were regarded as unavoidable.

Discussion

This series, though numerically insignificant, illustrates the problems, failures, and successes of the conservative treatment of perforated peptic ulcer. The problems are concerned with diagnosis, treatment, and the selection of cases.

DIAGNOSIS

The diagnostic problems may be considered from three aspects: (1) the proof of perforation of a peptic ulcer; (2) the differentiation between gastric and duodenal perforation; and (3) the differentiation between perforated peptic ulcer and other acute conditions.

Proof of Perforation.—All the patients in this series are believed to have had a perforated peptic ulcer. Free gas under the diaphragm has been taken to indicate that the stomach or duodenum has perforated. The quantity of free gas does not necessarily indicate the prognosis, since it is not a reliable measure of the extent or the virulence of the peritoneal contamination. The demonstration of free fluid is a much more valuable indicator. Of the patients treated conservatively 47 were submitted to radiological examination; free gas was present in 38, and fluid in 19. Radiography is not decisive when negative. In the first place, it is difficult to place a patient in great pain in the most favourable position for demonstrating gas; and secondly, an apparatus requiring only a short exposure is necessary to obtain a satisfactory film of a patient whose rapid, shallow, and painful respiration prevents him holding his breath for a long exposure. A merely confirmatory radiograph may be taken after the stomach has been emptied and pain further relieved by morphine, but in doubtful cases this procedure may not be justified.

In 10 patients treated conservatively, all of whom survived, radiography was either not available or failed to demonstrate gas; 8 of these had subsequent operations at which the surgeon was satisfied that there had been a recent perforation.

Differentiation of Gastric and Duodenal Perforation.—The number of gastric perforations treated conservatively is much smaller than that of duodenal perforations. There are a priori grounds for anticipating less satisfactory results with conservative treatment of gastric perforations, since the peritoneal contamination is usually more extensive and more virulent. This more severe assault on the peritoneum is due to the larger size of the perforation and to the absence of the barrier formed with duodenal perforation by the spastic pylorus, which divides the stomach contents from the perforation. With a large gastric perforation removal of excess fluid and food debris may be essential, although the peritoneum may be able to neutralise the fluid which has escaped through a small hole in the stomach. Moreover, there may be a limit to the size of the hole which can become sealed before further infection occurs.

If the treatment of a gastric perforation is to differ from that of a duodenal perforation, the two types must be differentiated from each other. This could not as a rule be done with confidence. The history and physical signs are often inconclusive; the precise results of previous radiological investigation (if any) are usually not known by the patient; and when a definite radiological diagnosis is available, it is not infallible (case 6).

Further experience may show that small gastric perforations through which little fluid escapes do as well with conservative treatment as do duodenal perforations from which they are clinically indistinguishable.

Large perforations associated with gross contamination are unlikely to be controlled by conservative measures; these require operative treatment. Profound shock and the radiological demonstration of quantities of free fluid may be the indications for operation. Thus as an indication for the method of treatment the site of the ulcer is less important than the extent and virulence of peritoneal contamination.

Differential Diagnosis.—That non-operative management may increase the risks if the diagnosis is wrong has been appreciated. In almost 80% of the patients treated conservatively in this series radiography confirmed the diagnosis beyond reasonable doubt; and when the radiographic appearance was normal, anxiety stimulated a careful review of the signs and symptoms.

Hæmorrhage and strangulation of a viscus are probably the most urgent indications for laparotomy, but they are seldom likely to be mistaken for a perforation. General peritonitis from causes other than perforation might benefit from aspiration, chemotherapy, and rehydration for a few hours before operation. Acute cholecystitis and acute pancreatitis are not urgent emergencies even if operation is regarded as the treatment of choice in the acute phase. Acute appendicitis is the commonest source of danger; and in this series 4 cases were operated on because the condition could not be excluded (a 24-hour radiological service was not available at the time); but in the ulcer age-group a 6-hour delay in operating for acute appendicitis is unlikely to be fatal.

When perforation of a peptic ulcer is regarded as an absolute indication for urgent operation, doubtful cases will be submitted to laparotomy. Sometimes, however, the alternative condition either contra-indicates operation, or is more satisfactorily treated after investigation and preparation. Confidence in the conservative régime has the advantage of providing time to establish the diagnosis and to apply deliberate treatment.

Maingot (1948) has estimated that 90% of perforated peptic ulcers are diagnosed correctly. It does not appear reasonable, therefore, that diagnostic difficulties should dictate a form of treatment which is not necessarily suitable for every case. The expediency of laparotomy is acknowledged; but it is unjust to condemn the conservative management of a perforated ulcer because it does not cure acute appendicitis or an internal hernia. The risks of incorrect diagnosis are reduced to justifiable proportions if three precautions are observed: (1) routine radiography; (2) careful observation during the first 6 hours; and (3) laparotomy when a condition requiring urgent operation cannot be excluded. In this series, 6 patients (less than 10%) were operated on because of diagnostic difficulties; and the number would have been fewer had a radiological service always been available. The diagnosis of perforated peptic ulcer was confirmed at autopsy in all cases where death took place after conservative treatment; and no patient died from another condition because he had been treated conservatively in the first instance.

Treatment.—Clearly the therapeutic measures which constitute "conservative treatment" have a limited influence on the natural course of the disease. An empty stomach is not essential for the sealing of an ulcer, particularly if the perforation is in the duodenum; a spastic pylorus is the natural barrier between the stomach contents and perforation of the duodenum; and with spontaneous cure this barrier has sufficed. In several successful cases in this series the stomach was not kept empty, despite the most conscientious efforts. There are several reasons for this: (1) it is almost impossible to ensure that the end of the tube remains at "the bottom of the sump"; (2) a patent tube may not function under negative pressure; (3) the time and patience required for efficient aspiration cannot always be given by an overworked staff (continuous suction is, in my opinion, less efficient than repeated aspiration). Moreover, there is evidence that if a duodenal perforation does not become sealed, the fluid escaping during the stage of ileus is foul intestinal contents. This contamination cannot be prevented by gastric aspiration as the fluid escapes before it regurgitates into the stomach. It cannot, therefore, be claimed that aspiration prevents the escape of fluid from a perforation, although in the early stages it may limit the quantity that escapes.

The second therapeutic measure is the administration of chemotherapy to control infection in the contaminated peritoneal cavity. One team gave penicillin only to 26 cases treated conservatively. A localised abscess developed in 2 cases, in each of which perforation had taken place more than 24 hours before. 3 other patients had local aspiration of fluid on the 2nd, 3rd, and 6th days after perforation, and in each case the fluid was reported sterile; but it is difficult to believe that all the organisms present were sensitive to penicillin. The decision not to operate at all when the perforation is sealed was a logical step forward after closure without drainage had proved so satisfactory. There is, however, a limit to the quantity of irritating or infective fluid which the peritoneum can successfully neutralise, even with the assistance of chemotherapy; and when this quantity is exceeded the excess should be removed.

The third, and possibly the most effective, therapeutic measure is the control of ileus. Whether peritonitis is chemical or bacterial, ileus develops; and when much fluid is present paralysis and distension of the gut may be extensive and long-continued. Efficient management of this complication is, therefore, as essential with the conservative method as it is after operation.

Selection of Cases.—The following indications for operation are suggested:

1. Where the surgeon is inexperienced. Experience is required both to reduce the risk of error in diagnosis, and for the observation of cases during the first 6 hours.

2. With failure of the conservative method. On account of our ignorance of the conditions necessary for sealing of the perforation, and doubt as to whether gastric aspiration fulfils these conditions, cases have to be judged individually. Signs of failure should be recognised while operative treatment can still be effective.

3. With gross peritoneal contamination. When the patient is profoundly shocked and does not respond rapidly to the relief of pain by aspiration and morphine, gross contamination of the peritoneum is probably present; and operation should be undertaken when the patient has been resuscitated. Aspiration of the irritating fluid may prove an essential part of restorative treatment; and even while shock persists aspiration of the fluid under local anæsthesia may be justifiable. Although such cases are more likely to have a gastric perforation, it is the effects of the perforation rather than its site that indicate the method of treatment.

4. Where the diagnosis is in doubt. If a condition requiring urgent operation cannot be excluded laparotomy is indicated.

The results in 39 consecutive cases treated by one firm, according to the principles outlined above, are shown in table IV.

TABLE IV—RESULTS IN 39 CONSECUTIVE CASES TREATED BY ONE SURGICAL FIRM

Treatment	No. of patients	Free gas present	No. of deaths
Conservative:			
Good-risk cases—			
Duodenal ulcer	18	18	0
Gastric ulcer	2	2	0
Poor-risk cases—			
Duodenal ulcer	5	3	0
Gastric ulcer	1	1	1
	26	24	1
Operative	13	..	2
Total	39	..	3*

*Mortality 7·6%.

The death in the group treated conservatively was case 9. The 2 deaths in the operation group (cases 18 and 19) have already been commented on, and were unconnected with the use of the conservative method. These results are no worse than those of many operation series, and 66% of the patients avoided a major operation under general anæsthesia.

Summary

Of 76 consecutive cases of perforated peptic ulcer, 50 were treated conservatively with 5 deaths, 4 of which were of patients rated unfit for operation.

With conservative treatment routine radiographic examination is essential. Cases of general peritonitis in which free gas is absent, and those in which free fluid is demonstrated, require particularly careful assessment.

Conservative treatment is practicable without specialised facilities; but it demands constant supervision by an experienced surgeon, notably during the first 6 hours, by the end of which time it is usually possible to tell whether this method is succeeding.

The conservative method is still on trial, and the indications for its use are not yet established.

I wish to thank Mr. W. E. Tanner, F.R.C.S., for his criticism and encouragement, and Mr. J. C. Gillies, F.R.C.S.E., for allowing me to include his patients in the series. I wish also to acknowledge the judgment and skill of Mr. R. F. Read, F.R.C.S., and Mr. H. M. Jamison, F.R.C.S., who were responsible for the successes in this series. I am grateful to Dr. H. P. Kent, who kindly reviewed the X-ray films.

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MEASUREMENT OF HEART SIZE

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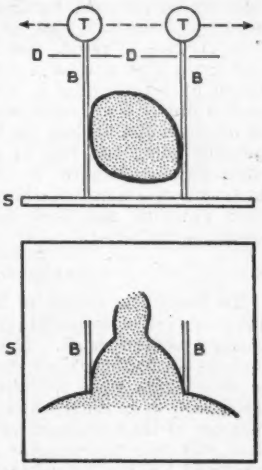
IN the diagnosis, prognosis, and observation of progress in heart-disease, no fact is of more importance than the size of the heart. Many methods of mensuration have been in use. In early days percussion and palpation had to be relied upon, but radiology as an exact method has largely superseded these in cardiac clinics, except for patients who are too ill to move from bed, or too remote from apparatus. Various methods of X-ray estimation of heart size have been employed, including the taking of a 6-ft. film and various types of mechanical orthodiagraphy.

We show here the value of a simple method of measurement and prove that it is reliable within narrow limits. The method is not new but seems to have fallen to some extent into disuse.

METHOD

The apparatus consists of a standard X-ray screening set but must be of the type in which the tube and shutters may be moved horizontally or vertically while the screen remains stationary. This is in contrast to the more usual arrangement in which the tube and screen are coupled so that the tube may not be moved without moving the screen with it. The vertical and horizontal shutters have separate controls. The patient is placed standing behind the screen and facing the examiner, and his position is adjusted, by palpation of the shoulders, chest, and hips, so as to ensure that the transverse plane of the chest is parallel with the screen. He is told to lean firmly forwards and to press the shoulders and upper part of the chest as near to the screen as possible, the arms hanging to the side. He is also told to stand with the feet firmly apart to prevent swaying.

When adequate visual accommodation has been reached, and a general view of the chest obtained, the vertical shutters are closed until the field is rather less than an inch wide. The tube and shutters are moved until the right border of the heart lies in the centre of this narrow vertical field. The position of this border is marked on the screen by a vertical grease-pencil line. The tube and shutters are now moved until the left border of the heart is in the centre of the field, and this border is marked in a similar way (see figure). It is advisable to return to the right and left borders again to confirm that the marks are still accurate, because the patient may have moved. Further precautions must be observed to obtain an accurate result. Measurement is taken after a full easy inspiration at the end of which the breath is not held in. The patient is asked to "breathe deeply into the stomach," and by observing the diaphragm it can be confirmed that the depth and character of the inspiration are natural and full. The heart is measured in diastole. Systole does not seem to influence the position of the right border to any appreciable extent, but on the left side there may be in some cases nearly a centimetre difference between the two cardiac phases. The mark of the grease-pencil on the right border will be made at a level slightly higher than that on the left, but the error so introduced into the transverse measurement can be kept to 0·1 cm. or so.



The narrow beam (B) from the movable tube (T) is reduced to a narrow slit and passes forwards, touching the left and right borders of the heart, on to the screen (S).

DIFFICULTIES

Certain difficulties are met with in an occasional case. Slight scoliosis may cause the right border of the spine to protrude further to the right than the right border of the heart. This was met with once in the investigation.

The presence of a triangular pad of epicardial fat between the outer and lower edge of the heart shadow and the diaphragm may introduce difficulty, particularly on the left side; but recognition of this is usually sufficient to make it possible to visualise the edge of the left ventricle without trouble.

The right border of the heart is in some people extraordinarily translucent to X rays, but here again care in the observation of shadow movement is nearly always sufficient to guard against error.

Patients must understand very definitely that they must not move, and the best way of ensuring stability is by reiterating to them that they must keep the upper part of the chest and the shoulders leaning firmly forwards against the screen.

In a few stocky adipose individuals the diaphragm may be so high that its shadow actually bisects the transverse cardiac diameter at a level which makes accurate transverse measurement difficult.

ADVANTAGES

The advantages of the method are that, if the screening-room is adjacent to the examination-room, the physician

can screen his own cardiac patients readily, and the screening becomes part of the clinical investigation. The method is rapid, and no expenditure on films is required. The method is superior to that of a 6-ft. film taken by a technician in the X-ray department, for in such a film it is unknown whether the heart is in systole or diastole, and holding the breath for the exposure may possibly alter the size of the heart. Moreover, the difficulty experienced by many patients in obeying instructions about breathing is apparent on screening such patients, and their misunderstandings can more easily be corrected.

ACCURACY OF METHOD

To prove the degree of accuracy of the method 53 persons were investigated, giving a total of 159 separate cardiac measurements. The experiment was done with batches of five or six people at a time. Three separate measurements were recorded in each case, and these were made in an order which was scrambled by the other member of the experimental team on each occasion. In this way the investigator making the measurement remained ignorant of the identity of the subjects and of the order in which they were being placed behind the screen. Care was taken that the subjects were not recognised, and a definite numerical figure of transverse diameter was noted after each experiment, the measurement being recorded at the time by the other member of the team.

RESULTS

The differences between the highest and lowest of the three separate "blind" measurements were as follows:

Difference (cm.)	*No. of cases*	
0·0	1	
0·1	3	
0·2	7	
0·3	12	49
0·4	9	
0·5	9	
0·6	8	
0·7	2	
0·8	1	4
0·9	1	

In 77% of the 159 measurements of heart size the divergence between the three separate measurements was 0·5 cm. or less, and in 92% it was 0·6 cm. or less. When it is realised that this error includes possible variation in the localisation of both the right and the left borders, the general accuracy of the method becomes still more striking. These results were obtained "blind." If, in routine clinical work, three similar measurements are taken they can be further checked if a significant error between two or more results is found. Further accuracy should then be obtainable.

EFFECT OF CHANGE IN POSTURE ON CARDIAC MEASUREMENT

One source of error in anteroposterior screening and measurement of the heart is due to the patient's chest being not quite parallel to the screen. To test whether slight inaccuracy in this position could introduce serious error, measurements were made first with the patient as straight as possible; secondly with the patient turned slightly towards the left anterior oblique position, with the left shoulder touching the screen; and thirdly with the patient rotated in the direction of the right anterior oblique position so that the right shoulder touched the screen. In neither of these two semilateral positions was the rotation great, but in each of them it was sufficient to be easily detectable by the hands of the examiner. Slight rotation towards the left anterior oblique position in 17 cases showed an increase in 3 only and a decrease in 14. In only 1 case showing an increase was this significant, 0·7 cm. In the other 2 it was negligible, 0·1 and 0·2 cm. Of the 14 cases showing a decrease in size, 8 showed a decrease which was insignificant (0·3 cm. or less) and 6 showed a measurable decrease, the figure varying between 0·6 cm. and 0·9 cm. The fact that so many showed a decrease, even though this was small in more than half of the cases, is possibly of some significance. Rotation towards the right anterior oblique position showed an increase in 7 cases and a decrease in 5. In 4 cases there was no change. The discrepancy of one case in the total number examined in this position was due to the fact that in one person the slightest degree of rotation towards the right caused the right border of the heart to be obscured by the vertebral column, which showed some scoliosis. The increase in this position in 2 cases measured 0·6 cm., in 5 cases it measured 0·5 cm. or less. The decrease in size in this position in all 5 cases was less than 0·4 cm.

Thus in both semi-oblique positions there was a significant increase in only 3 cases out of 33 measurements, this increase being about 0·6 cm. The decrease in size on turning towards the left anterior oblique position is presumably due to the fact that the long axis of the transverse cardiac diameter lies roughly in this direction. It is essential in cardiac mensuration to ensure that the patient is accurately facing the screen, but deviation from exact accuracy to a degree so slight as not to be detectable seems not to influence the accuracy of measurement to any significant degree. This positional source of possible error is common to all methods of radiographic heart measurement.

CONCLUSION

It is of great importance that there should be available in cardiological departments apparatus capable of measuring accurately and rapidly the size of the heart. The form of apparatus used in this series of experiments seems to provide these necessary qualities.

By careful measurement of the heart it can be determined in all cases whether the organ is of normal size, by comparing the figure with the theoretically normal figure of such tables as those of Hodges and Eyster (1924), in which allowance is made for the patient's age, height, and weight. Furthermore, the measurement of the heart at intervals of months or years provides invaluable information regarding diagnosis and prognosis. By routine numerical estimation of the transverse diameter of the heart, reinforced by screening in the oblique position, the examiner's opinion about the size of the patient's heart becomes progressively more accurate and reliable.

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DIAMINODIPHENYLSULPHONE IN THE TREATMENT OF LEPROSY

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A PAPER published some months ago (Lowe 1950) described our experience during 1948 and 1949 with diaminodiphenylsulphone (D.A.D.P.S.), given by mouth, in leprosy; a preliminary report had been published previously (Lowe and Smith 1949).

In general, the use of sulphone was held to be a great advance in the treatment of leprosy; the treatment was effective in all types of active leprosy, and D.A.D.P.S. was found to be much the cheapest sulphone to use and probably the most effective. Two modes of administration were recommended: (1) daily treatment with 100 mg. a day for two weeks, followed by 200 mg. a day for two weeks, and thereafter 300 mg. a day; and (2)

twice-weekly treatment with 100 mg. doses in the first week, 200 mg. doses in the second week, and so on to 500 mg. doses in the fifth and following weeks. These doses were found to be the largest that were well tolerated by African patients. The dosage was discussed, and the question was raised whether a dose of 300 mg. a day was necessary or desirable; it was suggested that "the best standard dose may be less than our present 300 mg."

Since that paper was written D.A.D.P.S. treatment has been rapidly extended to over 500 patients; further studies have been made of the dosage in relation to therapeutic and toxic effects, and the findings are presented here.

TOXIC EFFECTS

The toxic effects of D.A.D.P.S. are of the same nature as those encountered with other sulphones, and they are no more common than with other sulphones given in their usual doses. In the minimisation of toxic effects, gradual induction of sulphone treatment is of paramount importance.

Anæmia

A fall in hæmoglobin levels is the almost invariable accompaniment of sulphone treatment of any kind. This fall usually lasts a few weeks, and then the level becomes stabilised in Africans at about 11 or 12 g. per 100 ml., though in well-nourished persons it may be higher. A fall to below 9 g. per 100 ml. is an indication for a temporary cessation of treatment or a reduction in dose.

The anæmia produced by sulphones is said to be mainly hæmolytic in origin. It seems more than possible, however, that other factors contribute, such as iron deficiency and vitamin deficiency, for sulphones may interfere with iron absorption (Brownlee 1948), and may also reduce "refection" of vitamins in the gut. The administration of iron in the form of ferrous sulphate seems to help considerably in the maintenance of hæmoglobin levels. If the anæmia were purely hæmolytic, this should not be so. Some workers have recommended yeast preparations, but we have found them unnecessary, and are thus saved much trouble and expense in treating our very large number of cases.

In a few of our patients sulphone treatment has been rendered difficult by the presence of persistent anæmia associated with the liver dysfunction, possibly nutritional in origin, which is so common in our Africans; but on the whole anæmia has caused little trouble in our patients.

Experiments made here have shown that a gradual induction of treatment with D.A.D.P.S., more gradual even than that outlined in the previous report, can reduce the already low incidence and degree of serious anæmia.

Sulphone Dermatitis

About 2% of patients treated with D.A.D.P.S. on our original dosage have developed a generalised dermatitis caused by sensitisation. Unless the drug is stopped, the dermatitis may proceed to exfoliation and may even cause death, for not only the skin but also the mucosæ of mouth, larynx, respiratory tract, pharynx, and gastro-intestinal tract may be affected. A roughly similar incidence of dermatitis has been seen here with proprietary sulphones. Anti-histamine drugs are of great value in the treatment of this dermatitis.

Three striking facts about sulphone dermatitis are: (1) it always appears in the first six weeks of sulphone treatment or not at all; (2) it usually appears when the dose of sulphone has been raised above its initial level of 100 mg. a day; and (3) any attempt to start treatment with larger doses than usual, or to increase the dose more rapidly than usual, is immediately followed by a rise in the incidence and severity of dermatitis.

These facts suggest that the risk of dermatitis may be reduced by maintaining the initial dose for six weeks—i.e., until the period of possible dermatitis is past. When 200 patients were experimentally treated on this modified régime, there were only 2 cases of dermatitis.

Sulphone Psychosis

It is believed that this is the first published report of sulphone dermatitis. During 1948 and 1949, when 'Sulphetrone' was the main sulphone used, two patients complained of disorientation and other minor psychological disturbances, but no connection between this condition and sulphone treatment was apparent. Late in 1949 and early in 1950, when D.A.D.P.S. was being increasingly used, and experiments with high doses of D.A.D.P.S. were in progress, several cases of psychosis were observed, and it became clear that sulphones can produce a psychosis. The following 6 cases were all in African patients.

Case 1.—A man with lepromatous leprosy was treated with D.A.D.P.S., rising to 300 mg. a day, for eight months, and in the ninth month with 400 mg. a day. After a month on 400 mg. a day he complained of confusion and restlessness and said that the drug was "upsetting his brain." Treatment was stopped, and recovery was complete in a month. The patient has since taken 300 mg. a day for six days a week for several months with no further psychosis. He is an intelligent educated African. There is a reliable history of a previous attack of psychosis while he was receiving hydnocarpus oil.

Case 2.—A highly educated and intelligent but highly strung man, with some emotional instability accentuated by worry about his disease, was treated with the usual doses of D.A.D.P.S. rising to 300 mg. a day for four months, and thereafter with 400 mg. a day for two months, followed by 500 mg. a day for two months. No toxic signs appeared. He then reverted to the standard 300 mg. a day, and a month later, in the ninth month of treatment, he became very restless, talkative, and finally wildly excited and confused. This condition lasted several weeks, and later gave way to depression and retardation of mental and physical activity. The psychosis thus took the form of manic-depressive insanity. After four months recovery is not yet complete.

Case 3.—A man with tuberculoid leprosy was treated with D.A.D.P.S. with the dose increased at twice the usual rate, 100 mg. a day for a week only, 200 mg. a day for a week, and 300 mg. a day in the third week. In the third week the patient's liver and spleen were found to be enlarged and jaundice developed, and during the first nine months treatment was temporarily suspended twice for periods totalling several weeks. In the ninth month the normal dosage of 300 mg. a day was being given, when the patient developed a psychosis and became restless, talkative, and confused. The psychosis had religious manifestations (the patient was under the influence of a fanatical religious sect). Treatment was stopped, and within a month the patient became normal and has remained so. Treatment has not been resumed, since the disease is inactive.

Case 4.—A woman with tuberculoid leprosy, emotionally unstable, and worried by her separation from her young baby, was treated with D.A.D.P.S. in the usual dosage. In the ninth month she became restless and unmanageable, refused food, an became melancholic and depressed, weeping incessantly. Treatment was stopped. In three weeks she became normal, and treatment was resumed at 100 mg. a day. In two weeks the psychosis recurred, but it disappeared on cessation of treatment. A month later sulphetrone treatment was started and the dose raised to 3 g. a day. The psychosis recurred again, and is only now subsiding three weeks after the third cessation of treatment.

Case 5.—A woman with lepromatous leprosy started D.A.D.P.S. treatment on the usual dosage and after three weeks, while on 200 mg. a day, developed high fever (105°F) of unknown origin and a psychosis which was attributed to

the fever. She became restless, talkative, and incoherent. Treatment was stopped, and the fever and psychosis subsided. A month later treatment was restarted at 100 mg. a day, and in two days the fever and psychosis recurred. Treatment was stopped for another month. Treatment was then resumed with small doses of sulphetrone (1 g. a day), and so far there has been no recurrence. The patient is of a psychotic type.

Case 6.—A boy, aged 14, was treated with D.A.D.P.S. on our usual dosage rising to 300 mg. a day. Treatment continued for four months, when the boy said that the drug was affecting his brain, and that he was confused and could not remember where he was and what he was doing. Treatment was stopped, and the psychosis disappeared in two weeks. Treatment has not yet been resumed.

These 6 cases have occurred among 350 patients at present being treated with D.A.D.P.S. here. In 200 other cases being observed by us elsewhere, and being treated with lower doses, no psychosis has yet occurred. In three years' experience of sulphetrone treatment of over 250 patients we have seen only 2 mild cases of psychosis, but a few have occurred in other leprosy institutions in Nigeria. Psychosis seems to be more common and severe during D.A.D.P.S. treatment than during sulphetrone treatment.

Of the 6 cases, 3 occurred on abnormal dosage, either higher or more rapidly increased than usual; 1 occurred during a high fever of doubtful origin apparently precipitated by sulphones; and 2 occurred in the course of normal treatment, without other factors operating. A psychotic background was present in at least 4 of the cases. Psychosis tended to occur in the more highly educated and sensitive patient, apparently being rare in the ordinary simple Africans.

5 of the cases occurred during a period of four months at the end of 1949 and the beginning of 1950 when D.A.D.P.S. was being given seven days a week. 4 of the cases occurred in the ninth and tenth months of treatment. In the last four months, since treatment was reduced to six days a week, only 1 further case (case 6) was seen, and that was a very mild case. If further cases occur, we shall consider the advisability of reducing our maximal dose from 300 to 200 mg. a day. No case of psychosis has yet been seen on our modified D.A.D.P.S. treatment as outlined above.

Dr. B. D. Molesworth has told me that in Malaya he has seen a few mild cases of psychosis during sulphone treatment, but only in patients showing some mental instability before treatment.

Erythema Nodosum Leprosum

This condition can hardly be classed among the toxic effects of sulphones, since it sometimes occurs naturally in lepromatous leprosy. It can be precipitated by various drugs—e.g., potassium iodide—and by procedures such as smallpox vaccination. It is common during sulphone therapy, about 30% of lepromatous cases developing it at some time during treatment. It is characterised by malaise, fever, and painful and tender areas of inflammatory induration in the skin and subcutaneous tissue. The leprous lesions also often show acute inflammation; in the skin lesions this may be of little import, but in leprous nerves, eyes, and other vital tissues it may do serious damage.

This condition is not of bad prognostic import; often improvement becomes well marked only after several such incidents, which usually last only a few days. It is desirable, however, to try to ensure that these incidents are relatively mild and not too frequent, and here again a more gradual induction of treatment and a lower standard dose may help considerably. We now have, here and elsewhere, over 300 patients on D.A.D.P.S. treatment with a dosage of 200 mg. a day. There is strong evidence that the incidence and severity of this "reaction" is lower than in those on the higher dosage.

In the treatment of the "reaction" the injection of an antimony preparation—e.g., 'Fantorin'—has been found of value by us and by others (Wolcott 1947). In ordinary "reaction" with skin manifestations we have found anti-histamine drugs of little value. In some cases with neuritis, however, which may be intensely painful and distressing, anti-histamine drugs sometimes seem very effective. We have used 'Phenergan,' 1 tablet given on going to bed at night; it causes too much giddiness to be used in ambulant patients. Phenergan may also be useful in some cases of leprous iritis.

DOSAGE

Though in the leprosy settlement at Uzuakoli, with fairly close medical supervision, the dosage previously recommended, rising to 300 mg. a day, is still being maintained for most of our patients, we have been experimenting with different dosages which may be found more easily practicable in certain circumstances.

Here in Nigeria D.A.D.P.S. therapy in leprosy institutions with resident medical officers is now rapidly developing. Moreover, a rapid extension of sulphone treatment to outstations and leprosy isolation villages with no resident medical officer and only occasional visits from such an officer is being planned. Here and elsewhere in Nigeria over 1000 patients are already being treated with D.A.D.P.S., and within a few months treatment is expected to start in several thousands more. In these circumstances, close medical supervision being impossible, it is considered advisable to reduce the possibility of toxic effects to an absolute minimum. To meet this situation, the following two treatment régimes are suggested:

(1) *Twice-weekly treatment*, with doses starting at 100 mg. and rising by steps of 100 mg. each week to 400 mg. twice a week in the fourth week, this dosage to be maintained if possible as long as treatment lasts.

(2) *Daily treatment* for six days a week, the dose being 100 mg. a day for the first six weeks, and then 200 mg. a day.

Patients on twice-weekly treatment receive a dose of freshly prepared ferrous-sulphate mixture containing gr. 20 of ferrous sulphate on each treatment day. For patients on daily treatment the dose of ferrous sulphate is gr. 10 daily.

Either of these two régimes should be found practicable in patients in countries such as India, where the dosage previously recommended is often not tolerated. A recent personal communication from Mr. M. Smith, B.SC., suggests, however, that for Indian patients the dosage must be still further reduced if serious anæmia is to be prevented. The reasons for this are not clear, and further study is needed.

Both of these dosage régimes have the following advantages. The incidence and severity of anæmia are considerably reduced, particularly with the twice-weekly treatment. The incidence and severity of sulphone dermatitis is probably reduced, though it is not entirely prevented, occasional cases of dermatitis having been seen on both these régimes. Twice-weekly treatment should reduce the danger of continuing the administration of sulphone in the presence of dermatitis. The dermatitis often takes two or three days to develop completely; on twice-weekly treatment, therefore, any sulphone dermatitis which arises should be obvious before the next dose is due.

It seems probable that psychosis will be rare or unknown on the revised régimes; no case has yet been seen, but the modified treatment has not been in use long enough to make this fact significant, since psychosis has been seen usually in the ninth or tenth month of treatment.

"Reaction" is likely to be less common and less severe on the revised dosage régimes.

Experience previously reported led to the statement: "Improvement is not proportional to the size of the dose. Our patients on 400 and 500 mg. a day are not so far showing an appreciably more rapid response than those on lower doses." Further experience has confirmed this view. The higher dose, moreover, tends to produce psychosis, and the greatest daily dose in any circumstances should not exceed 300 mg. But does the proposed reduction to 200 mg. reduce therapeutic effectiveness? To this question no definite answer can yet be given. All that can be said is that good results are being observed here on 200 mg. a day, and even 100 mg. a day, and a correspondent has written that even 50 mg. a day is an effective dose.

In lepromatous cases, in which very long treatment is needed and improvement is slow but sure, years of experience will be needed before the most effective dose can be determined.

In tuberculoid cases, however, a response to treatment is seen in a few weeks or months. Evidence obtained here in such cases indicates that there is little if any difference between the speed of response in patients treated with 100, 200, or 300 mg. a day. The response is definitely quicker with daily treatment than with twice-weekly treatment, but this may be of little practical importance. It might mean that the treatment of this form of leprosy would take perhaps 18 months instead of 12–15 months, and even this is not at all certain.

CONCLUSIONS AND SUMMARY

The dosage of D.A.D.P.S. previously recommended is still being maintained here in African patients with little trouble and with good results. For widespread use in Nigeria with little medical supervision two modified treatment régimes with a reduced daily dosage are recommended: one for treatment on six days a week with doses rising to 200 mg. a day, and the other for treatment twice weekly with doses rising to 400 mg. a day. This reduced dosage, or even a still lower one, should be useful in other peoples—e.g., Indians—who are reported to tolerate sulphones less well than Africans. The reduced dosage does not seem to be appreciably less effective.

It is of vital importance that D.A.D.P.S. treatment for leprosy, which is believed to be the first reasonably effective and widely applicable treatment, should be adopted for general use in a form which gives the widest possible margin of safety compatible with therapeutic efficacy. Suggestions are made here to meet this need, and the toxic effects, anæmia, allergic dermatitis, psychosis, and "reaction" (erythema nodosum) which may still be encountered are described.

The cost of D.A.D.P.S. for the treatment of a patient on the modified dosage suggested is 6–9 shillings a year.

POSTSCRIPT

Since this article was drafted I have read an article by Floch and Destombes (1949) recommending treatment with daily doses of D.A.D.P.S. 200 mg. by mouth. They have treated 101 cases since November, 1948. They also mention injections of 200 mg. every day, of 400 mg. every other day, and of 600 mg. twice a week. Their work was almost simultaneous with ours, and neither we nor they knew of the others' work.

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HÆMOLYTIC ANÆMIA DURING TREATMENT OF LEPROSY WITH DIAMINODIPHENYLSULPHONE BY MOUTH

REPORT OF A CASE

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IN view of recent reports (Lowe and Smith 1949, Lowe 1950) of the treatment of leprosy with diaminodiphenylsulphone (D.A.D.P.S.) given by mouth, the following case-record is of interest and suggests that the administration of D.A.D.P.S. in the doses indicated may not be without serious toxic effects.

CASE-RECORD

A male Indian, aged 36, in good physical condition, had had leprosy for three years. During the past year his lesions had become worse.

On admission there were several erythematous infiltrated plaques on the right cheek, right buttock, arms, and back. The lesions were well defined and anæsthetic. The left great auricular nerve, one of the supraclavicular nerves on the right side, and both peroneal nerves were thickened. No enlargement of the liver or spleen was detected by palpation. Major tuberculoid (major lepride) leprosy was diagnosed. The lesions were negative to standard methods of examination, and the histological picture was that of a reactional tuberculoid (major lepride).

Investigations.—Examination of the blood showed red cells 4,600,000 per c.mm., Hb 13·6 g. per 100 ml., plasma-bilirubin within normal limits; and no methæmalbumin. Liver-function tests (thymol turbidity and alcohol turbidity) were normal. The urine on three successive days contained no urobilin (Schlesinger).

Treatment.—The patient was given D.A.D.P.S. 0·1 g. daily for thirteen days, 0·2 g. daily for ten days, and 0·3 g. daily for thirteen days.

Progress.—Thirty-five days after the start of treatment—i.e., on March 21, 1950—the patient complained of nausea, weakness, low fever, and constipation. A Schlesinger test for urobilin was strongly positive for the first time. Owing to an oversight D.A.D.P.S. treatment was continued for a further thirty-six hours, and the blood-sulphone level was 1·3 mg. per 100 ml. This figure is considered to be within the normal limits for D.A.D.P.S. (Smith 1949). The treatment was discontinued on March 23, the patient having taken a total of 7·1 g. of D.A.D.P.S., and on the same day the patient was admitted to the hospital ward in a toxic condition with much vomiting, a coated and dry tongue, and extreme asthenia. His temperature was 101·4°F. His spleen extended 1 in. below the costal margin and was soft but not tender. His liver was not palpable.

Investigations.—A blood-count showed red cells 4,200,000 per c.mm., Hb 12·7 g. per 100 ml., reticulocytes 27%, white cells 16,600 per c.mm. (polymorphs 51%, lymphoctyes 33%, eosinophils 3%, monocytes 13%). The polymorphs showed a pronounced shift to the left; no malaria parasites were seen; the plasma-bilirubin level was 2·6 mg. per 100 ml.; and a test for plasma-methæmalbumin was strongly positive. Liver-function tests (thymol turbidity and alcohol turbidity) were normal; the urine contained large amounts of urobilin (Schlesinger + +) but no bilirubin. On March 27, six days after the onset, bile pigment appeared in the urine for the first time.

Progress.—On March 28 the conjunctivæ were obviously icteric, the patient appeared completely exhausted, and the spleen and liver were tender, soft, and enlarged. The patient's daily temperature was varying between 99° and 103·4°F, the peak being reached at about 4 P.M. Examination of the blood showed red cells 3,000,000 per c.mm., Hb 12·7 g. per 100 ml. (? error due to presence of bile pigment); plasma-bilirubin 7 mg. per 100 ml., and methæmalbumin present. The urine contained urobilin and bile pigment.

March 30: the patient was apyrexial, but the liver and spleen were still enlarged and tender and the icterus was deepening. A blood-count showed red cells 2,900,000 per c.mm., Hb 9·3 g. per 100 ml., white cells 12,000 per c.mm.

(neutrophil polymorphs 50%, lymphocytes 40%, monocytes 10%, eosinophils 0). The shift to the left was no longer appreciable; the blood-D.A.D.P.S. level was 0·35 mg. per 100 ml.

April 4: the icterus was perceptibly decreasing, and the patient's general condition was much improved. The liver was still palpable and tender, but the spleen was no longer palpable. The urine still showed a trace of bilirubin.

April 10: the patient was well. No bile pigment was present in the urine, but Schlesinger's test for urobilin still continued to be positive. The blood still contained a trace of D.A.D.P.S.

April 25: the patient was discharged.

May 11: investigations showed red cells 4,800,000 per c.mm., Hb 12·6 g. per 100 ml., no evidence of any liver dysfunction (thymol turbidity, alcohol turbidity, and intravenous hippuric-acid test), and no urobilin in the urine.

May 15: an attempt was made to start treatment again, but after three daily doses of D.A.D.P.S. 25 mg. the patient complained of headache and backache and his urine again contained large amounts of urobilin (Schlesinger + +). Although neither liver nor spleen was palpable, the attempt to estimate the hippuric-acid synthesising power of the liver (Quick's intravenous test) had to be discontinued because of a severe attack of shivering during the intravenous injection of sodium benzoate.

DISCUSSION

Acute hæmolytic anæmia was diagnosed because (1) at the outset the laboratory findings of methæmalbuminæmia, bilirubinæmia, reticulocytosis, and urobilinuria obviously indicated hæmolysis, (2) D.A.D.P.S. is known to be hæmolytic, and (3) one of us (M. S.) had experienced similar cases undergoing D.A.D.P.S. therapy in West Africa.

Although infective hepatitis is not uncommon in India, this was not accepted as the diagnosis, because of (1) the initial enlargement of the spleen and the clinical toxic symptoms, (2) the absence of bile in the urine during the initial stages, and (3) the absence of any indication of involvement of the liver from liver-function studies. Further, leucocytosis and anæmia are not usually observed in infective hepatitis.

Clinically, the initial enlargement of the spleen and the toxic symptoms presenting themselves at the onset did not suggest infective hepatitis, but this diagnosis was considered and ruled out when the jaundice became apparent, because of the incidence of this condition in India.

Hæmolysis was not severe in the present case, causing only a total drop of 1,700,000 red cells and of 4·3 g. of hæmoglobin per 100 ml. The clinical symptoms were severe, however, and the jaundice lasted for a shorter time than is usual in infective hepatitis. The possibility that infective hepatitis had supervened on hæmolytic anæmia seems to be ruled out by the fact that the liver-function tests were within normal limits. The recurrence of what we thought were prodromal signs of hæmolysis when the patient was again given small doses (25 mg.) of D.A.D.P.S. may have been due to a sensitivity to D.A.D.P.S., or possibly the patient had not fully recovered from the previous attack.

SUMMARY

A case of hæmolytic anæmia during D.A.D.P.S. therapy is reported.

The initial laboratory evidence was a sudden strongly positive Schlesinger test for urine urobilin. Methæmalbuminæmia, bilirubinæmia, urobilinuria, and a decrease in red cells and Hb were observed. No evidence of any liver dysfunction, either during or subsequent to the jaundice, was discovered.

We wish to draw attention to the possibility of hæmolytic jaundice when D.A.D.P.S. is given by mouth. We regret that, owing to the distance from a fully equipped laboratory, more detailed tests were impossible.

Our thanks are due to the medical superintendent of Government Lady Willingdon Leprosy Sanatorium, Chingleput, Madras, and his staff for their assistance; Dr. R. G. Cochrane for his criticism and assistance with the preparation of this paper; the staff of the research department at the sanatorium for their coöperation; and Dr. Mungavin, of Imperial Chemical Industries, for his active interest and help. One of us (M. S.) wishes to thank the British Empire Leprosy Relief Association for facilities enabling him to make this study.

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EFFECT OF POSTOPERATIVE BED REST AND EARLY AMBULATION ON THE RATE OF VENOUS BLOOD-FLOW

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THE measurement of the rate of blood-flow over a limited section of the circulatory system has been attempted in many ways; these have been reviewed by Bellis (1943). The most usual method has been to introduce intravenously some substance which produces an observable reaction in the subject immediately on its arrival at some site in the body remote from that of the injection. For example, cyanide has been used to determine the arm-carotid or foot-carotid time, since by stimulating the respiratory centre it causes the subject to gasp when it reaches the brain; or saccharin may be injected, the end-point being the sensation of a sweet taste at the moment that the substance in the blood reaches the capillaries of the taste-buds. Such methods are not wholly satisfactory, since the section of the circulatory system over which the rate of flow is measured includes the pulmonary vessels and is therefore subject to various extraneous complicating factors. Personal errors may be introduced by the observer, who must note the reaction in the patient, and also, with some methods, by the patient when he indicates the end-points. Moreover the sites at which recognisable reactions can take place are few. These methods nevertheless give comparative measurements of the rate of blood-flow under varying conditions, provided that those conditions influence a sufficient proportion of the circulatory path under observation; where the altered conditions are confined, as they often are, to a limited section of the vascular circuit, however, they tend to be obscured.

With the introduction of radio-isotopes, techniques have been devised which are both more flexible and precise. The instant of first arrival of a radio-isotope introduced into a vein in an extremity can be detected with objective precision at any proximal point in the vessel. By the suitable arrangement of injection and recording sites, the mean rate of flow in cm. per sec. over any desired section of the vein may be determined with considerable accuracy. In the present study these technical methods were applied to the problem of venous stasis in the limbs of patients during the postoperative period.

METHOD

The technique used was the same as that reported previously (Osborn and Wright 1949, Wright et al. 1948, 1949, 1950). A small volume (0·2–1·0 ml.) of radioactive isotonic saline solution containing 2–10 μc Na^{24} per ml. was injected intravenously in the extremity (foot or hand) under standard conditions of temperature and posture. The time of the first arrival of the isotope

TABLE I—AVERAGE RATES OF VENOUS FLOW IN AMBULANT AND IN NON-AMBULANT PATIENTS

Day	Rate of flow (cm. per sec.)			
	Leg		Arm	
Preoperative During anæsthesia	4·5 ± 0·24 (103) 6·2 ± 0·55 (37)		10·0 ± 0·87 (45) —	
Postoperative	Group 1. (Ambulant)	Group 2. (Non-ambulant)	Group 1. (Ambulant)	Group 2. (Non-ambulant)
1–3	4·8 ± 0·85 (6)	4·2 ± 0·65 (20)	—	11·9 ± 1·64 (12)
4–6	5·0 ± 0·54 (9)	3·8 ± 0·49 (24)	10·3 ± 1·04 (5)	10·5 ± 0·38 (7)
7–9	5·5 ± 1·14 (19)	2·9 ± 0·32 (23)	11·1 ± 1·09 (8)	8·4 ± 1·74 (14)
10–12	7·1 ± 0·29 (24)	2·8 ± 0·37 (15)	—	7·6 ± 1·11 (13)
13–15	5·6 ± 0·51 (21)	2·7 ± 0·29 (16)	11·5 ± 1·01 (7)	7·5 (3)
16–18	4·7 ± 0·59 (15)	2·9 ± 0·41 (7)	10·3 ± 1·23 (13)	—
19 +	5·2 ± 0·56 (25)	3·9 ± 0·59 (13)	10·2 ± 1·19 (10)	8·9 ± 1·61 (6)

Numerals in parentheses indicate number of observations.

at the proximal end of the limb was detected by a screened Geiger-Müller counter placed over the femoral triangle for the leg and in the axilla for the arm. An electric circuit was devised that provided a kymograph tracing on which was recorded the moment of the injection, the instant at which the radioactive material reached the counter, and a suitable time scale. From the times thus recorded and a knowledge of the distance between the injection site and the window of the counter shield, the mean rate of venous flow up the limb could be calculated.

MATERIAL

117 surgical patients were investigated preoperatively and at weekly intervals during convalescence. Records were obtained from 42 of these at the end of the operation while the patient was still anæsthetised in the theatre. Since anæsthesia was produced by various means and combinations of drugs and for differing times, no conclusions can be drawn as to the effects of different anæsthetics on the flow-rates.

For the analysis of the data obtained during the postoperative period, observations were separated into two main divisions: (1) those made on patients who were ambulant (walking) at the time the record was taken; and (2) those made on patients who had remained uninterruptedly in bed since the operation. Thus the data from any single patient would be included in group 2 so long as they remained continuously in bed, but from the day of ambulation onwards their records would be included in group 1. The progressive transference of patients from group 2 to group 1 will be apparent in table I. The distribution of cases in these two groups at the tenth postoperative day was as follows:

	Ambulant	*Non-ambulant*
Hysterectomy	20	9
Colporrhaphy	7	31
Amputation of cervix	2	1
Ventrisuspension	1	1
Repair of rectal fistula	1	1
Gastrectomy	1	3
Myomectomy	8	—
Ovicystectomy	3	—
Salpingectomy	3	—
Dilation and curettage	3	—
Sterilisation	2	—
Thyroidectomy	2	—
Excision of thyroid cartilage	1	—
Osteomyelitis of jaw	1	—
Ureteral transplantation	1	—
Resection of gut	1	—
Dental cystectomy	1	—
Radical mastectomy	1	—
Cholecystectomy	1	—
Correction of hallux valgus	—	1
Inguinal herniotomy	—	3
Vulvectomy	—	1
Drainage of psoas abscess	—	1
Lobectomy	—	1
Carcinoma of œsophagus	—	1
Prostatectomy	—	1
Compound fracture of tibia and fibula	—	1
Total	60	56

A further division of cases has also been included. It was shown previously (Wright et al. 1950) that, in pregnancy, retardation of venous flow in the legs was first apparent during the second trimester. In the present series, therefore, observations on the venous flow in the legs of patients with pelvic tumours which gave rise to masses greater in size than a sixteen-week pregnancy were considered separately throughout as group 3.

RESULTS

The average mean flow-rates in both arms and legs, together with their standard errors, are set out for groups 1 and 2 in table I. The figures in parentheses give the numbers of individual observations.

Where the total numbers were too small for their standard errors to have significance, these have been omitted. Observations made in the postoperative period have been grouped into three-day periods so that the numbers in each shall be sufficient to allow of statistical treatment.

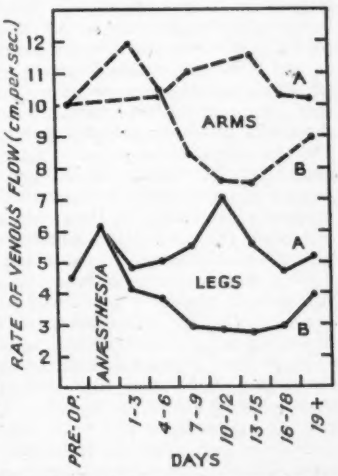

Fig. 1—Average rates of venous flow on various days in arms and legs of 103 surgical patients: A, ambulant; B, non-ambulant.

The data from table I are set out graphically in fig. 1. The mean rate of venous flow in both the arms and the legs (curves B) of the patients continuously confined to bed (group 2) showed a progressive slowing until the fifteenth day; in other words, there was a generalised venous slowing in the limbs and presumably, therefore, in the circulation as a whole.

In group 1 no such slowing in either the upper or the lower limb (curves A) was apparent; indeed there was an increase in the flow-rate which was most marked in the legs and which reached a maximum ten to twelve days after operation. A similar though smaller change in flow-rate occurred in the arm.

In group 3 there was a somewhat different finding. The figures are set out in table II and fig. 2. The initial flow-rate in the legs was significantly slower than for the main groups and corresponded closely to those previously reported for women sixteen weeks pregnant. These tumour-bearing patients showed an increase of flow-rate under anæsthesia similar to that in groups 1 and 2, and this was followed by a return to about the

initial figure within a few days. Those patients who became ambulant (curve A) showed, by the tenth day, an increase in leg venous flow-rate almost identical with that in group 1, but those who were confined to bed (curve B) also showed an increase, but to a lesser and only doubtfully significant degree.

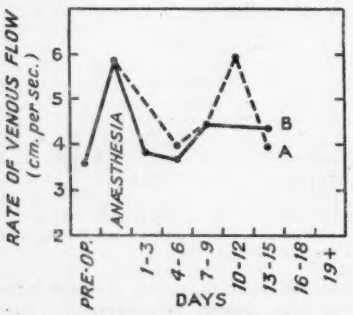

Fig. 2—Average rates of venous flow on various days in the legs of 19 patients from whom large pelvic masses were removed: A, ambulant; B, non-ambulant.

So that the relative changes in flow-rate for the various groups should be more easily appreciated, the figures are set out in fig. 3 as percentages of the initial rates for groups 1 and 2—i.e., 100% is taken as 4·5 cm. per sec. for legs, and 10·0 cm. per sec. for arms.

DISCUSSION

Since the time of Virchow the importance of venous stagnation as a factor in the onset of thrombosis has frequently been emphasised. Should the venous flow become abnormally slow during the postoperative period, probably the effect of the increased numbers (Dawbarn et al. 1928) and adhesiveness (Wright 1942) of the platelets, and the increase in erythrocyte-sedimentation rate (Austoni 1936) would more readily promote thrombus formation at any point of intimal damage. The modern treatment of surgical patients by early ambulation is mainly based upon the belief that the venous return from the legs is retarded during the second week after operation in those who are confined to bed, and that this stagnation coincides with the maximal thrombogenic changes in the blood.

So much importance has been attached by some clinicians to the early mobilisation of patients that the American Medical Association (1944) devoted a session to a symposium on the "Abuse of Bed Rest," and other workers have drawn attention to the dangers of venous stagnation (Newburger 1943, Borgström 1950). Nevertheless the evidence on which is founded such wholehearted support for the early ambulation of surgical patients is still slender. It is based mainly on clinical considerations and observations, the patients' subjective feelings, and certain statistical surveys (Schumacher 1927, Leithauser 1943, Canavarro 1946, Lam and Hooker 1946, Westerborn 1946) which show that the incidence of thrombosis and embolism is less in those patients who have been moving actively soon after operation. Such statistics are, however, difficult to interpret, because the seriously ill patient, or one in whom a superimposed infection is present, is more likely both to be kept in bed and to develop thrombosis. In some reports, moreover, it has been shown that early ambulation alone does not wholly obviate thromboembolism (Blodgett and Beattie 1946, 1947, Powers 1947).

There are, however, certain studies on rates of venous blood-flow which have a direct bearing on the practice of early ambulation. Frimann-Dahl (1935), using serial phlebograms, showed that both in normal persons confined to bed and in surgical patients in the preoperative period, the flow in the femoral and saphenous veins was so greatly retarded that stagnation might be almost complete. Since there was no comparable stasis in the upper limb, he concluded that its occurrence in the legs resulted from (1) raised intra-abdominal pressure, (2) inactivity, and (3) the formation of venous eddies at the sapheno-femoral junction.

Further blood-flow estimations have been made in the postoperative period by other workers. Webb et al. (1936), using the saccharin method, and Bellis et al. (1943), using cyanide, reported a decrease of several seconds in flow-time immediately after operation. Their measurements were made within the first forty-eight hours, while the patients temperatures were raised and they were still receiving sedatives. These factors were considered to have affected their findings. Kvale et al. (1940) and Smith and Allen (1940), on the other hand, also using the cyanide method, found that from the third postoperative day onwards the foot-carotid time was prolonged; from a preoperative mean value of 35 sec. it had increased to a mean value of 57 sec. by the tenth day. These observations were later supported by those of Bjork and Strombeck (1945), who measured the flow-time daily after operation by the injection of fluorescein, timing its appearance in the patient's lips. The times recorded by Kvale et al. (1940) and Smith and Allen (1940) seem to correspond fairly well to ours, when allowance is made for the more complex vascular pathway over which they made their measurements. They found little change in the flow-time in the upper limb (arm-carotid time, pre-op. = 19 sec., tenth day post-op. = 25 sec.), but this may be due to the failure of their method to disclose changes in venous flow-rate which are shown clearly by our technique. As can be seen in fig. 3, the change in the arm flow-rate is small relative to that in the leg.

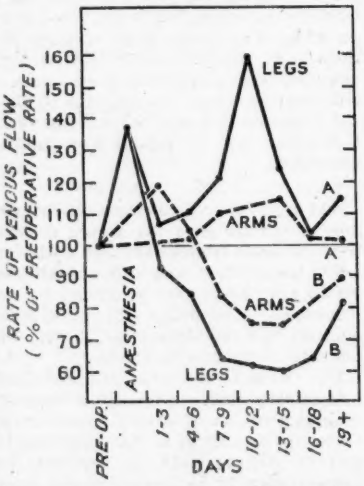

Fig. 3—Average rates of venous flow on various days expressed as percentages of the preoperative rate of flow in arms and legs of surgical patients: A, ambulant; B, non-ambulant.

Since in the present series there is a preponderance of patients who underwent operations for colporrhaphy in the non-ambulant group and for hysterectomy in the ambulant group, it might be argued that the type of operation was the determining factor which influenced the degree of stasis developing during convalescence. That no such bias is significant, however, is shown by the fact that, when each of the more common types of operation in this series is analysed separately, the same differences in rates of blood-flow between ambulant and

TABLE II—AVERAGE RATES OF VENOUS FLOW IN LEGS OF WOMEN WITH PELVIC TUMOURS

Day	Rate of flow (cm. per sec.)	
Preoperative	3·6 ± 0·38 (19)	
During anæsthesia	5·8 ± 1·54 (5)	
Postoperative	Ambulant	Non-ambulant
1–3	—	3·8 ± 0·47 (6)
4–6	3·9 ± 0·54 (5)	3·7 ± 0·65 (5)
7–9	4·4 ± 0·56 (6)	4·4 ± 1·53 (5)
10–12	5·9 ± 1·59 (8)	—
13–15	3·9 ± 0·96 (8)	4·3 (2)

Numerals in parentheses indicate number of observations.

non-ambulant patients were found within them as in the whole groups.

It seems likely from our observations, which confirm those made by other workers using different methods, that the immobilised patient undergoes a progressive slowing of the venous flow in both legs and arms during the postoperative phase, though that in the lower limbs is much the more pronounced. Moreover, the present figures also indicate that in ambulant patients, in whom such circulatory changes have not hitherto been reported, venous flow-rates exhibit an acceleration just at that time when such patients are most vulnerable to the other factors which contribute to thrombus formation. The comparison of leg flow-rates in groups 1 and 2 can leave little doubt of the advantage to the patient so far as this aspect of postoperative care is concerned.

As might have been expected from our previous observations on pregnancy and ascites, the venous flow-rates in the legs in patients with pelvic tumours were abnormally slow when first examined. In those who were permitted early postoperative walking the venous flow began to accelerate by the fourth day and thereafter followed the same course as in the group of mobile patients as a whole. Those confined to bed, however, also showed an acceleration over their preoperative time by the tenth day, but this was less than in the ambulant patients of the same type. The removal of the pelvic mass, which we believe acts as a mechanical obstruction to the venous return from the legs, adversely affected the blood-flow in the lower limbs of these patients to as great an extent as did the enforced immobilisation.

SUMMARY

1. Venous flow-rate in the limbs of 117 surgical patients were measured on different days after operation.

2. In patients who were ambulatory during convalescence, no slowing of venous flow was apparent in either leg or arm. In patients confined to bed, a reduction of flow-rate, which was most marked at ten to twelve days after operation, was found.

3. Changes in flow-rate were always greater in the leg than in the arm.

4. Observations on patients from whom pelvic masses were removed suggested that the alleviation of intra-abdominal pressure had a greater influence than post-operative ambulation on venous flow-rate.

5. The importance of venous stasis in relation to postoperative thrombosis is discussed.

We wish to thank Prof. W. C. W. Nixon and Prof. R. S. Pilcher for permission to examine their patients. This work has been supported by a grant from the Medical Research Council.

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AN EXPERIMENT ON THE TRANSMISSION OF COLDS

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THERE is a strong body of evidence that the common cold is an infectious disease caused by a virus or a group of related viruses. Opinion is sharply divided on the relative importance of coarse droplets, droplet nuclei, and indirect manual transfer in the transmission of the disease from person to person (Andrewes 1949). The elucidation of these problems has an obvious bearing on what methods might be employed for the control of the spread of the disease.

Study of the natural methods of transmission of infection in colds has proved difficult. Experiments at the Common Cold Research Unit, Salisbury, using volunteers after three days' isolation, were unsuccessful because of the low incidence of takes in the groups exposed to infection. In one test only 1 of 19 normal people who lived for some hours with cold sufferers contracted a cold; in a second test none out of 4 so exposed; in a third test 1 out of 5. All these colds were "pedigree" colds which had undergone several person-to-person passages at Salisbury by intranasal inoculation. In addition one natural "wild" cold failed to pass to any of 5 normal people.

On the other hand, numerous observers attest that small groups living in isolation for some months acquire greatly enhanced susceptibility to colds, so that most of them develop symptoms shortly after making contact once more with "civilisation." The Norwegian explorer Adolf Hoël (quoted by Høygaard 1939) stated that Arctic explorers commonly caught colds on returning home even after as short an absence as three to four months. After such relatively short absences, however, the colds thus caught were milder and shorter than after longer expeditions. Such reports encouraged us to hope that a small party isolated for about three months might acquire sufficient susceptibility to permit studies of the methods of spread of cold infection.

The experiment to be described was designed to determine the effective routes of person-to-person transmission of colds. As will appear, the original objective was not attained, but other interesting and unexpected findings make the attempt seem worth recording.

THE ISLAND EXPERIMENT

We were fortunate in learning, through Dr. Fraser Darling, of an island, Eilean nan Ròn, lying about 1½ miles off the little port of Skerray on the north coast of Sutherland. This island has a number of well-built stone houses on it, but had been uninhabited for twelve years, the population having left it from pressure of economic circumstances. It is owned by the Duke of Sutherland, who kindly allowed us to use it for purposes of this experiment. Eilean nan Ròn is rather over a mile long, under a mile wide, and is bare, mostly covered by moorland. Picturesque cliffs surround it, but there is a landing-place from which a flight of steep steps leads to the plateau on top of the cliff.

Early in July, 1950, 12 volunteers landed on the island for three months' stay; most of them were students from Aberdeen. With them were landed camp equipment, stores and all necessities, so that no personal contact between them and the mainland should be necessary for about three months. A small radio transmitter and receiver kept them in daily communica-

tion with the mainland. On three occasions shepherds visited the island to attend to the sheep grazing there, but they made no contact with the volunteers.

Preliminary Isolation Period

The volunteers were left in otherwise complete isolation from July 12 to Sept. 19, 1950 (ten weeks). At the very beginning a small outbreak of colds occurred. One man had a cold on arrival (July 8); another case occurred on July 9, and 3 more on July 11. These rapidly cleared up and no more occurred during the isolation period.

Period of Experiment

On Sept. 19, the party of 12 separated into three groups of 4, A, B, and C. These thereafter lived and cooked for themselves in separate buildings, not closer together than 50–100 yards. The island was divided into three territories, to one of which each party was restricted. On that day (Sept. 19) 2 of us (C. H. A. and J. E. L.) landed and joined party C to see whether normal cold-free people could "carry" cold virus in their respiratory tracts or elsewhere on their persons and so convey infection to the "islanders." One of us had not had a cold for about five, the other for about eleven, months. No colds developed as a result of this contact by the evening of Sept. 23.

On Sept. 23, one of us (T. S.) arrived with 5 others; all 6 had been inoculated intranasally at Aberdeen on Sept. 19 with one of our "pedigree" virus strains from the Salisbury unit. On arrival on the island, 4 of these subjects had already got colds; in the other 2, colds were doubtful, but they developed well later. The cold strain used (Pool 96) had the following history: cold washings from a child aged four years were diluted 1 in 100 with saline and passed intranasally to 6 people, 2 of whom developed colds; washings from 1 of them were inoculated into thirteen-day chick embryos amniotically; after five days' incubation at 36·5°C, amniotic fluid was harvested; this induced a definite cold in 1 of 4 inoculated volunteers; four further human passages from him were carried out and gave "takes" in 10/18, 9/20, 5/10, and 5/6 persons respectively. This last passage (Pool 96) giving 5/6 takes at Salisbury was the one taken to Aberdeen. At each passage, washings were stored at −76°C for some days. It may be mentioned that on a number of occasions we have produced colds with fluids from eggs inoculated amniotically, but have not done so with sufficient regularity to convince us that we have cultivated a virus.

EXPERIMENTS TO STUDY THE ROUTES OF TRANSFER OF INFECTION

Indirect Contact

The 6 "colds" spent three hours in a room of group A's house in the absence of the party themselves. During their occupation they were liberal in the way they disseminated nasal discharge on playing cards, books, cutlery, handles of cups, letters, chairs, door-handles, and tables. Care was taken to avoid contact with any of the 4 members of group A or to allow the possibility of direct aerial transmission of particles from the respiratory tract. With this object the occupied room was aired by opening doors and windows for half an hour between departure of the "colds" and reoccupation of this room by party A. These then occupied the room for three hours, freely handling the objects contaminated by the cold cases.

Exposure to Airborne Particles

The 6 "colds" occupied a sealed room with party B; they were separated from them by a blanket stretched across the room but not reaching to floor or ceiling. During three hours' exposure, the cold cases talked freely, coughed occasionally, and were induced to sneeze frequently with snuff. Group B remained silent and neither coughed nor sneezed. Air collected by means of a slit-sampler revealed that a satisfactory number of small airborne particles passed over the blanket to group B.

Direct Contact

Group C (who had previously been exposed to the 2 normals) lived and ate with the 6 "colds" from Sept. 23 to 26, when 5 of the 6 "colds" left the island. The 6th (T. S.) remained with party C till the end of the experiment (Oct. 4).

Results

Much to our surprise no colds had developed in any of the 12 exposed "islanders" by Sept. 29. It was particularly unexpected that none of party C caught colds, though very fully exposed.

COMPARISON OF INFECTIVITY OF NATURAL AND INDUCED COLDS

After the failure to obtain "takes" from exposure to induced colds we decided to conduct an experiment to compare the infectivity of natural and induced colds. We succeeded in learning of a crofter with a cold on the adjacent mainland; he came across to the island for the day on Sept. 29 and gave an opportunity for the spread of his cold to party B, living with them and talking round a fire for two periods of two hours each. He had developed the cold five days earlier (Sept. 24); when he arrived it was at the mucopurulent stage and there were signs suggesting mild frontal sinusitis. He was still blowing his nose occasionally but not coughing or sneezing.

Later, on Sept. 29, 4 more people arrived, having been inoculated with colds induced by Pool 96 in Aberdeen on Sept. 25: 2 of them had good colds; the other 2 were apparently incubating them, as they developed after they landed. Party A was "challenged" by direct exposure to these 4 colds. The total period of exposure was six hours, composed of three hours on the evening of Sept. 29 and three hours on the morning of Sept. 30. In the morning session only 3 of the cold cases were used for the "challenge."

Party C was exposed both to the natural cold (for about three and a half hours) and by living with the second lot of induced colds for four days (up to Oct. 3).

Results

Of the 4 of party B exposed to the natural cold 3 developed typical colds; 1 started on the night of Oct. 2–3, the other 2 on the morning of Oct. 4. Again, no colds were induced in party A by exposure to induced colds. The contrast is rendered less clear-cut by the failure of colds to develop in any of party C, exposed to both natural and induced colds. One of them did, however, develop a cold 36 hours after leaving the island (Oct. 6) this was possibly contracted on Oct. 3 from one of party B.

After-history

Two weeks after their return to their homes only 1 member of group A had developed a cold and 2 members of party C. Altogether 6 of those isolated for three months failed to develop colds either when exposed on the island or within a fortnight of returning to the mainland.

DISCUSSION

The abundant field information on the increased susceptibility to colds induced by a period of isolation is too seldom precise and quantitative. No great administrative difficulties need be encountered in arranging for careful tests of the question. Unfortunately, three months is the longest period for which, in Britain, it is practicable to obtain volunteers from among students on vacation, and it seems that ten weeks' isolation is not adequate to induce uniform susceptibility. It is possible that a few people act as carriers of cold virus and that presence or absence of one of these in a

small group might determine whether such a group became rapidly and uniformly susceptible.

Our results suggest that there is a difference between natural and artificial colds as regards infectivity. Full exposure of 8 previously isolated persons to 10 induced colds, both in their incubation and fully developed stages, failed to reveal one instance of natural "jumping" of infection; on the other hand, one natural cold, even though it had reached its fifth day, and was no longer active, induced colds in 3 out of 8 persons after an exposure of only three and a half hours.

A difference in spreading power between the natural and propagated colds is perhaps attributable to attenuation of the infective agent by the artificial manner of its transfer or as a result of storage. This is not certain, however, for the crofter's cold may not have been due to the same type of organism as that in Pool 96, though the infections in both instances were fairly typical colds. Loss of "jumping" power on passage through the natural host has of course its parallel in what was seen when variolation was practised. The Hampstead strain of ectromelia virus has also lost much of its infectivity after years of laboratory passage. Shope (1934) has reported similar behaviour on the part of *Hæmophilus influenzæ suis*.

SUMMARY

A group of 12 persons after complete isolation for ten weeks did not show greatly enhanced susceptibility to natural acquisition of common-cold infection. A cold virus had been artificially propagated in normal persons by intranasal inoculation and in addition had apparently survived one amniotic passage in fertile hens' eggs; this virus still induced colds in 15 out of 16 persons on intranasal inoculation but it failed to be transmitted by natural contact. In contrast a natural "wild" cold did spread to 3 of 8 subjects.

We wish to thank His Grace the Duke of Sutherland for allowing us the use of Eilean nan Ròn; Mr. and Mrs. F. J. Betteridge who worked so hard on the island to make the expedition run smoothly; the other volunteers who came to the island for longer or shorter periods; departments of the Royal Navy, the Royal Air Force, the Ministry of Health, and the General Post Office for the loan of equipment or help in other ways; and many other persons, too numerous to mention individually, for helpful coöperation.

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BACTERIAL VARIANTS IN PATIENTS TREATED WITH CHLORAMPHENICOL

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IN cultures made from the urine of several patients under treatment with chloramphenicol for urinary infections atypical bacterial colonies developed, examples of which are described below. Some of these strains could be identified as variants of the original infecting organism.

Case 1.—Before treatment was begun, cultures of this patient's urine grew typical colonies of *Pseudomonas pyocyanea*. During the first three days of chloramphenicol treatment the number of colonies isolated diminished, and on the fourth day the urine seemed to be sterile. On the fifth day, however, colonies again appeared on plating; on blood-agar the colonies were small, 0·5–1·0 mm. in diameter, greyish, opaque, dry, and extremely rough, with a lobate ragged periphery. When picked off they left an impression on the plate. They had a membranous consistence, resembling small pellicles, and could not be emulsified. Microscopically they consisted of motile slender gram-negative bacilli.

They produced a diffusible green pigment on agar and in broth, where they formed a surface pellicle. The morphology of the colony remained unchanged through 19 subcultures, whereas when left on the plates at room-temperature the colonies soon became large and confluent, with a rich mucoid consistence. Subcultures from the edges, which seemed even more mucoid, grew the same tiny rough dry colonies.

At the 19th subculture, besides the small rough colonies, some larger ones with mucoid periphery appeared, and on further subculture these gradually assumed the appearance of normal *Ps. pyocyanea*. The small rough colonies of the 19th subculture bred true through another 10 subcultures, when some mucoid variants appeared again.

Similar dry pellicle-like colonies were isolated from swabs of the patient's hands. These colonies grew on 1% cetrimide agar; produced on agar and in broth a diffusible green pigment soluble in chloroform and in water; formed a surface pellicle in broth; liquefied coagulated serum and gelatin; consisted of gram-negative motile rods; and had the characteristic odour of *Ps. pyocyanea*. These are the characteristics of *Ps. pyocyanea*; and, since repeated subculture produced mucoid variants which eventually became indistinguishable from that organism, the culture was identified as *Ps. pyocyanea*.

Case 2.—Before treatment with chloramphenicol was begun this patient's urine grew a coliform bacillus and *Ps. pyocyanea*, the characters of which were noted. Twice a day during treatment, samples of mid-stream urine were plated, and the sediment was examined.

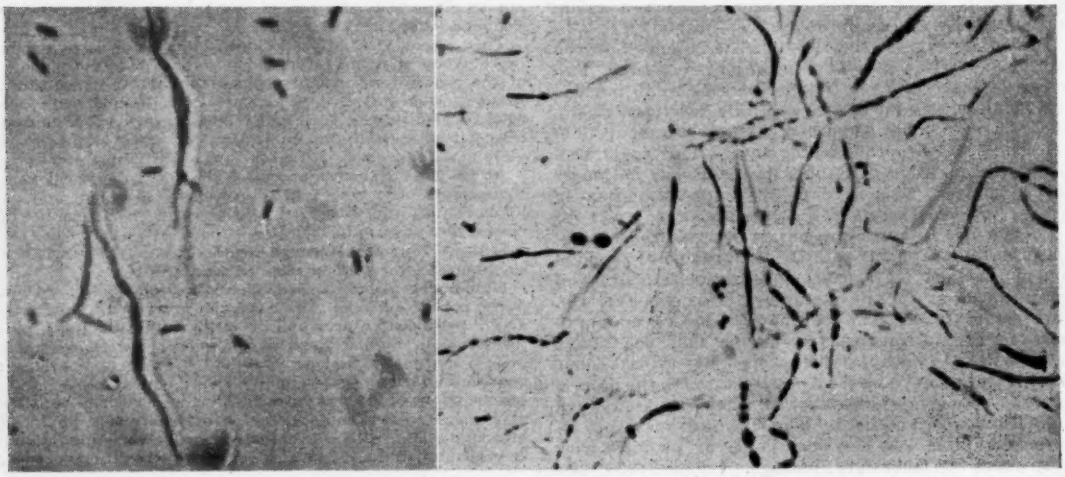
After the patient had received 2 g. of chloramphenicol in one day the sediment contained chains of cocci, bacilli, some diplobacilli, motile single bacilli, and some long thick rods. On plating, the urine yielded hæmolytic coliform colonies consisting of gram-negative motile bacilli. *Ps. pyocyanea* seemed to have vanished.

On the fourth day of chloramphenicol treatment, however, besides the typical coliform colonies, other types appeared. Some were tiny colonies, 0·5 mm. in diameter, circular, dome-shaped, with glistening surface, transparent, and easy to emulsify. They formed a uniform turbidity in broth. The growth consisted of gram-negative non-motile bacilli. After a few subcultures on normal laboratory media these reverted to typical coliform colonies.

Colonies of another type also appeared. These were dry and rough, produced a diffusible green pigment on agar and in broth, and in all respects were similar to, and behaved like, the small colonies isolated in case 1 which had been identified as of *Ps. pyocyanea*.

Case 3.—Before treatment, cultures of this patient's urine yielded colonies identified as a coliform bacillus. When he had received 9 g. of chloramphenicol in 72 hours another specimen of urine was plated. After 24 hours, on blood-agar, this had grown a few barely visible colonies, which, on further incubation, enlarged and became like those of a streptococcus. Unstained preparations examined by phase contrast showed a mixture of types. There were chains of small cocci the size of streptococci. Some chains consisted of small and large cocci, and others had a large bulb at one end or in the middle. Other chains consisted of bulbs of different sizes, or of a mixture of bulbs, cocci, and rods. There were also bacillary chains, in some of which, the individual members were of equal size, whereas in others there were both small rods and large swollen ones. Giant bizarre forms of different shape, size, and thickness (see figure) were also present. Most of the organisms were gram-negative, but a few were gram-positive.

The tiny colonies were transplanted into broth, and after 48 hours' incubation there was a very poor granular growth consisting of the same pleomorphic population. To exclude the possibility that the culture was a mixture of different organisms a slide serum-agar culture was prepared with a highly diluted inoculum. This was placed on the warm stage, and under phase-contrast microscopy a chain of small cocci was chosen and left to grow. After overnight incubation the chain had increased in length, but instead of cocci the additional members were bacilli. Then, with a micromanipulator, individual members from the coccal and bacillary chains, as well as representative types from all the abnormal forms, were isolated and left to grow in droplets of broth in the oil chamber. The bulbous and giant forms did not divide. Some became slightly larger, and in some bulbous chains one or two additional members appeared, but all these forms lysed



(a) (b)

Pleomorphic culture obtained in case 3. Unstained bacteria seen by phase-contrast microscopy: (a) × 2000; (b) × 1200.

without further multiplication in spite of repeated attempts. However, all the other organisms, coccal or bacillary, reproduced the original pleomorphic picture, including the bulbous and giant forms.

When left on the plates at room-temperature, some of the tiny colonies became smoother and much larger (some fifty times their original size). Subculture from these large colonies, after they had been left for a month at room-temperature, again produced a poor granular growth in broth, though richer than the first, and small colonies on blood-agar though slightly larger and smoother than the originals. Microscopically there were the same bizarre forms and chains. On repeated subculture the tiny colonies reproduced the same pleomorphic population, with a slight progressive reduction in the ratio of abnormal large bulbous forms to coccal and bacillary chains.

With the gradual disappearance of the large non-viable forms the colonies enlarged until, after repeated subculture over months, they lost all resemblance to the original hardly visible colonies which required enriched media for growth. After a few hours' incubation they now gave a rich growth on blood-agar as well as on agar. The colonies were very rough and the size of normal coliform colonies. In broth they produced both definite turbidity and a granular sediment. The organisms have, however, kept their peculiar pleomorphism, though the large bulbous forms are now rare and many diplobacilli have been added to the population.

Serological reactions showed that the original coliform and the pleomorphic strain had some antigenic constituents in common; but the latter was very rough and only occasionally gave good emulsions, so its serology could not be more thoroughly studied.

Cases 4, 5, and 6.—These were patients with coliform infections of the urinary tract. After treatment with chloramphenicol organisms very like the pleomorphic strains described above were isolated from their urines. Very large doses of these organisms were injected intraperitoneally into mice without any obvious ill effect, whereas much smaller doses of the original strains killed the animals.

In subsequent experiments in vitro an organism similar to the pleomorphic strains was also obtained by subjecting *Bact. coli* to the combined action of chloramphenicol and antiserum. Other variants, isolated by the same process, are described in an accompanying paper.

CONCLUSIONS

Organisms obtained from the urine of patients receiving chloramphenicol treatment sometimes show profound morphological and cultural alterations, which may include loss of virulence, and may be lasting or transient.

The emergence of organisms with altered characters is important, in that the infecting organism, although still present, might escape observation. When they revert to the normal these variants may be responsible for relapses. They may also be significant in the detection of carriers.

PRODUCTION OF BACTERIAL VARIANTS IN VITRO WITH CHLORAMPHENICOL AND SPECIFIC ANTISERUM

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THE observation that atypical colonies, breeding true through a series of subcultures, could be isolated from the urine of patients treated with chloramphenicol led to an attempt to induce similar changes in vitro by subjecting bacteria to the action of chloramphenicol. The organisms chosen for these studies were strains of a coliform bacillus isolated from two untreated patients whose urine was later found to yield atypical colonies when chloramphenicol treatment was being given.

Chloramphenicol Alone

Young broth cultures of these strains were used to inoculate broth tubes containing chloramphenicol in concentrations ranging from 2 to 250 μg. per ml. Throughout 2 weeks' incubation samples of these cultures were removed twice daily for examination by phase-contrast microscopy and inoculation into broth and on blood-agar.

No growth was apparent in the tubes containing 16–250 μg. of chloramphenicol per ml., but direct preparations showed rods, many enlarged up to five times the original size, which on plating yielded normal colonies, mostly smooth but with occasional rough-smooth types. No other abnormality was noticed. No forms like those obtained from the urine of the treated patients or any other sort of stable atypical colonies were obtained throughout the whole experiment.

Chloramphenicol and Specific Antiserum

It was then thought that special conditions in the body might have influenced the production of these forms, and the combined action of chloramphenicol and specific antiserum was therefore investigated. The organism studied was *Bact. coli* D433, for which a strong anti-

serum was available (agglutination 1 : 1600) and under the combined action of this antiserum and chloramphenicol alterations were obtained in both the colonial and the cellular morphology of the bacteria.

This paper deals particularly with the variants which have been reproduced through a sufficient number of subcultures to be regarded as stable. The intermediate stages have also been carefully studied in an attempt to define the way in which these variants arise. The observations seem to support the assumption that, in some cases at least, variants are a result of injury to the normal parent cell.

The technique most often successful in producing variants was as follows:

Broth containing 250 μg. of chloramphenicol per ml. is inoculated with a small inoculum (0·01 ml. per ml.) of an 18 hours' broth culture of *Bact. coli* D433. After 24 hours' incubation an equal volume of the antiserum is added and the culture further incubated. This procedure seems to give variants more regularly than when the antiserum is added at the same time as the chloramphenicol. Samples are examined daily by phase-contrast microscopy and planted into broth and on blood-agar. Variants are usually isolated some time within 1–6 days, mostly within 24 hours.

Control experiments with *Bact. coli* D433 in broth, in chloramphenicol alone, or in antiserum alone, failed to yield stable atypical colonies on subculture. Experiments starting from whole cultures as well as from single-cell cultures were carried out, but the results were the same.

FINDINGS

Fresh Preparations Viewed by Phase-contrast Microscopy

A few hours after the addition of antiserum, the culture consists of greatly swollen cells arranged singly, in chains, or in masses of entangled chains. As further hours pass the bacteria show increased damage. The masses seem to fuse progressively as if the bacterial walls have melted. The single bacilli are greatly swollen and practically round; their lining membrane is no longer sharply defined but looks hairy, as if it is deteriorating and about to disintegrate. Still later, only severely damaged round bodies and masses of tiny particles can be seen.

Subcultures in broth or on blood-agar give one of the following three types:

Type 1.—Granular growth in broth, consisting usually of a mixture of forms: most of the cells are in bacillary form, some being larger than normal; chains of bacilli, a few chains of coccal forms, and some large lanceolate diplococcus-like organisms are also present. Plating on blood-agar yields mostly normal coliform colonies, but small shiny dome-shaped colonies are also present. On further incubation very tiny colonies become visible, and these on subculture give usually a mixture of small shiny dome-shaped colonies and a range of very tiny ones, some moist and others dry, just visible with the hand lens. The moist colonies reproduce usually as a mixture of small shiny dome-shaped colonies and dry colonies, whereas the very tiny dry colonies bred true-forming variants, one example of which will be called variant α (fig. 1).

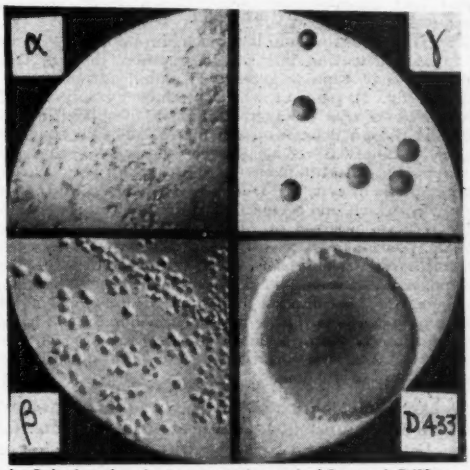

Fig. 1—Colonies of variants α, β, and γ, and of *Bact. coli* D433 on same serum-agar plate.

Type 2.—Very poor granular growth in broth, hardly visible before 48 hours' incubation, consisting of an extensively damaged population. Most cells are grossly enlarged and misshapen. The prominent forms are large, about the size of red blood-cells, and shaped like lanceolate cocci or diplococci and large club-shaped bacteria. These monstrous forms reappear throughout many subcultures; then gradually the rate of growth increases and the cells are smaller but retain their pleomorphism.

On repeated single-cell cultures the giant forms do not divide; some grow a little more before lysing, but they all lyse without multiplying. From smaller healthier-looking cells, however, all the range of the giant cells is reproduced.

On blood-agar type 2 yields a mixture of colonies of sizes ranging from very tiny to forms looking like typical colonies of enterococcus (fig. 1). Some produce a greenish discoloration of the blood, others a complete hæmolysis. All types may be present on the same plating. On old plates the colonies enlarge up to ten or twenty times their original size; they are

TABLE I—AGGLUTINATION AND ABSORPTION OF AGGLUTININS

Antigens used	Dilutions of antiserum to *Bact. coli* D433						
	1/100	1/200	1/400	1/800	1/1600	1/3200	Control
Serum unabsorbed							
D433	++++	++++	++++	++++	+++++	+	−
α	++++	++++	+++	++	+	−	−
β	++++	++++	++++	++++	+++	+	−
γ	++++	++++	++++	+++	++	±	−
Serum absorbed by D433							
D433	−	−	−	−	−	−	..
α	+	±	−	−	−	−	..
β	−	−	−	−	−	−	..
γ	−	−	−	−	−	−	..
Serum absorbed by α							
D433	++	++	+	−	−	−	..
α	++	+	+	−	−	−	..
Serum absorbed by β							
D433	−	−	−	−	−	−	..
β	−	−	−	−	−	−	..
Serum absorbed by γ							
D433	+++	+++	++	++	+	+	..
γ	+	+	−	−	−	−	..

round and dome-shaped, and have a waxy appearance. Variant β belongs to type 2.

Type 3.—The growth in broth is again hardly visible before 48 hours' incubation but is less granular than in type 2. On blood-agar type 3 gives very small streptococcal-like colonies (fig. 1) some of which produce hæmolysis. These colonies breed true for a great number of subcultures (over 200) and do not change on old plates. The morphology of the cells—elliptical coccobacilli or short fusiform bacilli—also remains constant from the first subculture. Variant γ is an example of type 3. It arises abruptly, in contrast with variant β, which one seems to be able to watch developing. After a large number of replatings, however, the rate of growth of variant γ increases, as happens with all the variants described. Growth appears earlier, the colonies are larger, and rods are seen among the population. These larger colonies are sometimes surrounded by a rough flat margin which occasionally spreads like a film. Occasionally, on platings from old broth cultures there was a thin film of growth covering most of the blood-agar plate; on subculture this film grew typical γ colonies.

As has been mentioned, all these variants grow very poorly for a number of subcultures after their first isolation. On nutrient agar the growth is even poorer, and for this reason blood-agar has been used in these experiments.

TABLE II—SUGAR FERMENTATIONS OF *Bact. coli* D433 AND OF VARIANTS α, β, AND γ

Strain	Lactose	Glucose	Dulcitol	Mannitol	Saccharose
Bact. coli D433	+	+	−	+	+
Variant α ..	+	+	−	+	−
,, β ..	+	+	+	+	+
,, γ ..	+	+	−	+	+

+, acid and gas

After a variable number of replatings larger colonies appear in cultures of variants α and β, and these eventually revert to coliform colonies indistinguishable from those of the parent strain. After some 200 subcultures in one year, variant γ has not yet reverted to normal. Larger and smoother colonies have, however, been obtained in some platings, and the population consists mostly of bacilli and some longer rods. Growth on moist plates favours reversion.

Characters of Variants

Gram staining.—The variants so far described are gram-negative.

Virulence.—Intraperitoneal inoculations of large doses of these variants had no ill effects on mice, whereas smaller inocula of the original strain killed all the inoculated mice and the organism was recovered from their heart blood.

Serological reactions.—All the variants are agglutinated almost to titre by the antiserum to the original *Bact. coli* D433. The finding of complete or almost complete cross-absorptions proves that variants α and β are antigenically closely related to the parent strain; whereas the partial absorption obtained with variant γ suggests that one or more of its antigenic constituents are lacking or changed (table I).

Sugar fermentations.—Variant γ ferments the same sugars as the original strain, but variant α does not ferment saccharose and variant β ferments dulcitol, thus differing from *Bact. coli* D433 (table II).

TABLE III—RESISTANCE TO INIMICAL AGENTS

Strain	Greatest concentrations permitting growth			
	Penicillin (units per ml.)	Potass. tellurite	Chloramphenicol (μg. per ml.)	Streptomycin (units per ml.)
Bact. coli D433	50	1/320,000	6	3
Variant α ..	50	1/40,000	24	3
,, β ..	6	1/2500	3	3
,, γ ..	12·5	1/640,000	0·75	>1·5

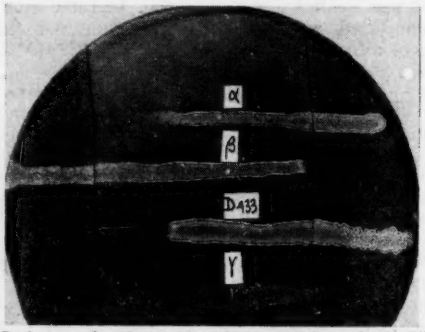

Fig. 2—Resistance of variants α, β, and γ to potassium tellurite 1/100,000 (on left) and to penicillin 50 units per ml. (on right) compared with that of *Bact. coli* D433.

Resistance to inimical agents.—As table III and figs. 2 and 3 show variant β is more sensitive to penicillin and more resistant to potassium tellurite than the original strain. Variant α shows increased resistance to potassium tellurite, but it is also more resistant to penicillin whereas variant γ is more sensitive to all the drugs used. All the variants except α are either equally sensitive or more sensitive to chloramphenicol than the original strain. Of the many variants isolated, some of which closely resembled variant α, it was the only one resistant to chloramphenicol. It may have originated, by selection, from a cell of high resistance to chloramphenicol—indeed in a freshly isolated single-cell culture it was found that the cells often differed in their resistances to chloramphenicol.

Variants were also obtained from a strain of *Salmonella typhi* and a penicillin-resistant staphylococcus, but these will be dealt with elsewhere.

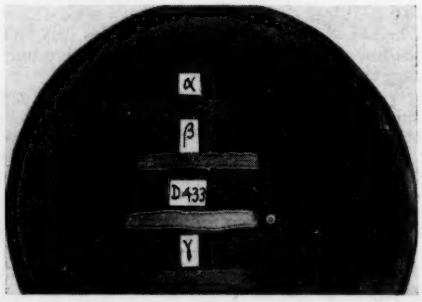

Fig. 3—Resistance of variants α, β, and γ to streptomycin 500 units per ml. (on right) and to chloramphenicol 100 μg. per ml. (on left) compared with that of *Bact. coli* D433.

There have also been isolated, in experiments using *Bact. coli* D433, atypical colonies which have not yet been identified.

DISCUSSION

The action of chloramphenicol and antiserum on a specific strain of *Bact. coli* has led to the appearance of atypical colonies diverging greatly from normal but whose relationship to the original strain has been established through reversion to the normal or through serological reactions.

These changes need not be specific to chloramphenicol and antiserum. Any agent causing the cell an injury or a disturbance of the same degree will probably lead to the production of similar variants. All variants described by different workers have been obtained from cultures submitted to unfavourable conditions, such as

ageing, unsuitable temperature or pH, or exposure to bacteriophage, chemicals or X rays.

As regards the emergence of variants α, β, and γ, the simplest explanation would be that they are present in undetectable numbers in the original culture as a result of a spontaneous mutation, and that through the process used they are selected and their further growth is favoured.

Selection and favoured growth, however, are highly improbable in most of the present cases because (1) most of the variants were more sensitive to the mixture of chloramphenicol and antiserum than was the original strain; (2) most of the variants needed a large number of subcultures to give a fair growth on normal laboratory media on which the original strain would grow readily and profusely; and (3) a whole range of variants with markedly different characters can be obtained from a freshly isolated single-cell culture, and, whereas many variants may belong to the same group and have closely similar characteristics, no variant is an exact replica of another.

The emergence of variant β is particularly suitable for study. Variant β is produced by steps, by survival of healthier bacteria out of an obviously "ill" population. As has already been shown by single-cell culture, the giant individuals which, in the first subcultures, form the greatest proportion are cells doomed to death. They cannot divide, they grow up to a point and lyse, and single-cell cultures of other almost "healthy" looking members illustrate the way these giant cells appear.

It seems as if these healthy-looking bacteria carried in themselves an important defect which made them produce monsters. One has the impression that the organisms were very ill and perhaps just escaped an almost deadly injury; they survived, but the injury provoked in the cell lasting alterations which caused the progeny to differ from the original strain.

The non-viability of most of the progeny of the cells accounts for the very poor growth, especially following the first isolation, whereas on repeated subcultures the healthiest individuals survived, the viable proportion of the progeny increased, the giant cells disappeared, and the growth improved. A particular phase of growth during the action of the poisonous agent might have been responsible for the difference in characters among the variants obtained; or different mechanisms might have been involved. Whereas there is no clue to how variants α and γ arose, the changes described in type 2 strongly support the claim that variant β was the result of a mutation induced by a profound disturbance or injury of a vital element in the "reproductive system" of the cell.

If chromosomes and genes in bacteria are to be accepted (there is strong evidence that they should), a change in a gene or in a block of genes may lead to the production of daughter cells with altered characters. The range of types obtained unpredictably in these experiments could then be linked with the range of alternative types, the "alleles" to which a gene can unpredictably mutate.

The profound injury inflicted on the cell by chloramphenicol and antiserum might provoke the strong disturbance necessary to evoke a change in the genes and thus induce mutation. Possibly this mechanism does not differ fundamentally from that responsible for "spontaneous mutation."

Klimek et al. (1948), Bellamy and Klimek (1948), and Gale and Rodwell (1948) have described a staphylococcus which, when rendered highly resistant to penicillin, has the morphology of gram-negative rods and pleomorphic cocci. This organism I found to be very sensitive to potassium tellurite, to which ordinary staphylococci are highly resistant. The findings here and similar work done on a penicillin-resistant staphylococcus suggest that a double process may have been involved in the production of their variant: (1) selection of a resistant organism, and (2) injury to the cell by the high concentration of penicillin.

CONCLUSIONS

Alterations in morphology, sugar fermentations, resistance to inimical agents, and antigenic structure can be induced in *Bact. coli* D433 by treating cultures with specific antiserum and chloramphenicol.

Some synergism exists between chloramphenicol and antiserum, since a combination of the two seems to have a more potent effect on the cells than either has alone.

Resistance to chloramphenicol and to penicillin vary independently and must therefore have separate genetic locations.

Gram-staining, sensitivity to penicillin, and resistance to potassium tellurite are correlated, but the correlation is not absolute.

These variations, which range from changes in antigenic structure to a complete change of characters, might illustrate the evolution from one serological type to another, or from one species to another.

Studies of the avirulent variant and its reversion to the normal might help to explain variations in virulence.

I am indebted to Mr. Ben May, of Alabama, for financing this work and for providing the micromanipulator without which accurate results could not be obtained; Dr. Pierre de Fonbrune, of Paris, for teaching me to use his micromanipulator; Dr. Joan Taylor for providing *Bact. coli* D433 and its antiserum; Sir Alexander Fleming and Prof. Robert Cruickshank for their valuable advice; and Mr. T. Jefferies for the photographs.

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Medical Societies

ROYAL SOCIETY OF MEDICINE
What is General Practice?

THE society's new section of general practice held its first scientific meeting on Dec. 20, with Dr. G. F. ABERCROMBIE, the president, in the chair.

Dr. G. O. BARBER said that the question which had been asked during the formation of the section was: "What is general practice?" So it seemed logical to try to define the difference between medicine as practised by the general practitioner and medicine as practised in the hospital by the specialist.

General practice was such an individual matter that each practitioner was bound to have a different concept of his work. As a young man, Dr. Barber had just joined a practitioner who had been in the district for forty years when he overheard a patient say: "I don't hear very good reports of this young man; I hear he has to examine people before he knows what's wrong with them." He thought at the time: "I'll show them." It took him many years to realise that he was wrong then, and that the old lady was right. He did not mean that the general practitioner should not examine patients and keep records; but the good G.P., living with his patients and knowing the details of their lives, got so intimate a knowledge of them that often his examination of them simply confirmed the impression he got as they walked into the consulting-room. General practice was, in one sense, being with one's patients.

Medicine in hospital was medicine in vitro, while general practice was medicine in vivo. The general practitioner was the naturalist stalking his prey in the jungle, whereas the hospital consultant only examined his specimens in the zoo. The essence of general practice was studying man as a natural animal, in his environment. In general practice one had the advantage of knowing

the case-history. When the student as a clerk took a patient's history at the bed-side, the answers he got were really the patient's impression of the answers; in general practice the doctor knew these answers from his own observation. Living in the neighbourhood, the practitioner gained a knowledge of his patient by observing his heredity as well as his environment—which was very important knowledge when the stress syndrome began to develop. One often observed in different members of a family a tendency to break down in the same way.

There were two conflicting views of the scope of general practice. One was that as medicine and surgery and the allied specialties became more and more complicated, the general practitioner must become an intelligent signpost to the outpatient departments. Dr. Barber believed the opposite to be true. He believed that it was the general practitioner's duty to oversee the specialist investigations; and when he passed on a patient to a specialist or a hospital department, it was part of his duty to see that the specialty was applied properly and according to the patient's needs. The practitioner should not think: "Oh, I've sent him to hospital. Now I can forget about him until he comes back." Whether a patient was well or ill, he should have a general practitioner who felt responsible for him. Such over-all responsibility sometimes took the general practitioner a good deal away from academic medicine; but this responsibility for the patient in sickness and in health was the driving force of general practice. The emergency call might be for something trivial. But general practice consisted not so much in treating the triviality which caused the panic in the home and perhaps the neighbourhood, as in treating this "herd panic." This was especially true of births and deaths. At the birth of a first baby not only the mother but the expectant father and the grandparents needed treatment; and the handling of them should be as effective as that of the confinement. Death, too, did not affect only the person who was going to die. The practitioner could make all the difference between a never-forgotten blow and an event that drew together the remaining members of the family.

It could be argued that general practice was degenerating into the treatment of trivialities; and in this case general practice would be humdrum but worthy. But Dr. Barber did not believe that any case was trivial; for the triumph of general practice was in sifting trivialities.

General practice would always be what the individual practitioner made of it: it was his own conception of his duty to his patients.

Dr. J. D. SIMPSON remarked that the responsibility borne by the general practitioner differed from that borne by his hospital colleagues. He should have a special knowledge of the environment of his patients; for the treatment of a given condition varied in relation to the person's immediate circumstances. Thus the doctor must be prepared to accept greater risks for the man having his "last shot" at a university scholarship than he would for a boy who was taking one part of his first M.B. from school at the age of 16. The question of fitness for athletics was often put to the general practitioner. If called on to make a decision on behalf of the team by the captain, he must decide the risk to the patient and to the side. For example, one more dislocation would not do great harm to the good rugger-player who had already dislocated his shoulder twice, but the side might lose him early in the game. One transient loss of consciousness did not justify a diagnosis of epilepsy; and in these circumstances electro-encephalography would, in nine cases out of ten, confuse the issue, as would the administration of phenobarbitone "to stop any further fits." How much better and more courageous to tell the patient that "it was a faint," and to wait without giving drugs till the next attack, which might never happen. Sometimes the doctor might be wrong, but the number of patients he would save from fear of a disease which they had not got would amply justify his action. He must, of course, tactfully stop them indulging in particularly dangerous activities.

A special subject of research gave the practitioner additional incentive and interest. His opportunities for research were twofold. First, there was the long-term collection of cases of a particular disease; for this he must keep a nosological record—a list of patients who had had the disease. When planning an investigation, he should first seek a statistician's advice. Secondly, there was the recognition of clinical syndromes during epidemics.

In summary, the general practitioner must be expert in the environment of his patients, and he should not fear to accept responsibility which will save his patients anxiety.

Dr. C. M. BILLINGTON thought there was no good in going back to the family doctor of 1884, who had little armament except love; it was necessary to look at what the general practitioner could do to produce health, either on his own or in a team. This was a new concept.

Dr. E. P. SCOTT recalled that Mackenzie did his work on digitalis when a general practitioner at Burnley. He was sorry that the expression "family doctor" had gone out. It would have been a pity if the artist had labelled that famous picture "The General Practitioner" instead of "The Doctor"—and much worse if he had made it, as it might become, "General Medical Operative."

Dr. E. B. RAYNER said that when the general practitioner passed his patient on to the hospital service he too often did not—for reasons well known—pass on sufficient information.

Dr. LAURENCE DULAKE regarded the general practitioner as the only "proper doctor"—all the rest were incomplete doctors. The object of general practice, as he saw it, was to give people another chance. An old doctor had told him that G.P.s fell into two classes—the "pooh-poohers" and the "tut-tutters." Dr. Dulake did not hold with "tut-tutting" out loud; but he would prefer to know, by examination, whether a patient was epileptic or not. He found that about 60% of patients suffered from gross psychological disorder. Linkage with psychiatrists in the neighbourhood was useful for the general practitioner.

Dr. D. M. HUGHES thought that general practice was the practice of being a "doctor." A specialist was not a doctor in the traditional sense; he wanted to practise medicine as an intellectual pursuit and incidentally to help the patient and doctor. Dr. Hughes was not saying that one concept was higher than the other; but the two were different.

Dr. LINDSEY BATTEN also pointed out that general practitioners were the only people in the profession who looked after the whole patient. He did not think this could be done by teams; it had essentially to be done by the individual. One job of the general practitioner was to explain to the patient what was the matter with him; a complaint about hospitals was that the patient often came out without ever learning the nature of his illness. The general practitioner had not only to introduce the specialist to his patient, but in a sense to protect the patient from the specialist.

Dr. M. C. ANDREWS limited, as far as possible, the number of consultants he called in, so that they got to know not only the patients but himself and his attitude to the patients.

Dr. DELISLE GRAY said that young men in hospital did not know what general practice was. Before specialising, they should learn what general practitioners did: they should first spend 6–12 months in general practice.

Dr. BARBER made it clear that he had not suggested that the general practitioner should not examine the patient; but that without the case-history the examination might be futile. When the practitioner came into a home he should bring a therapeutic influence, but anxiety was likely to return after he left. Here the bottle of medicine was valuable as an emblem of his continuing authority.

Reviews of Books

Medical Treatment

Principles and Their Application. Editor: GEOFFREY EVANS, F.R.C.P., consulting physician, St. Bartholomew's Hospital. London: Butterworth. 1951. Pp. 1398. £5 5*s*.

AT a time when so many new drugs and methods are being introduced, it requires both skill and courage to produce a book on medical treatment—skill in selection and courage in rejection. Dr. Geoffrey Evans has exercised both virtues, and, marshalling a team of more than fifty contributors, has produced a volume likely to prove a standard work of reference for doctors throughout the world. The series of monographs, covering the whole field of medical treatment, reflect the enormous advances that have been made during the past few years. The information is up to date, including such topics as 'Aureomycin' and chloramphenicol, aminopterin, vitamin B_{12}, the rice diet, and the treatment of acute renal failure by intragastric drip; and though the articles naturally vary both in form and quality, all of them are practical. Some, such as that by Professor Haddow on the chemotherapy of cancer, are fully annotated reviews; others, such as an excellent section on diseases of the gall-bladder by Dr. E. R. Cullinan, are based on personal practice and unsupported by references. Dr. Paul Wood presents a clear and reasoned account of the treatment of heart-disease, and the chapter on pulmonary tuberculosis by Dr. Robert Coope and Mr. Price Thomas is worthy of its authors. Sections on geriatrics, rehabilitation, and the treatment of dental sepsis are included; and dermatology, pædiatrics, the tropical diseases, and industrial hazards are expertly discussed.

Since treatment is not stereotyped, it is inevitable that certain statements invite criticism. It seems a pity, nowadays, still to recommend an acid-ash diet in the prevention of renal calculi, to surround adiposity with an aura of mystery, and even to refer to the use of autogenous vaccines in the treatment of intestinal toxæmia. Many physicians would not agree that the mercurial diuretics are reliable in the treatment of the œdema of type II nephritis, and the usual dosage of penicillin in subacute bacterial endocarditis is now higher than that recommended. These are, however, minor points; and we welcome a book that deserves, and is sure to receive, an enthusiastic reception.

Congenital Heart Disease

(2nd ed.) J. W. BROWN, M.D. Lond., F.R.C.P., physician to the Grimsby General Hospital. London: Staples Press. 1950. Pp. 344. 30*s*.

SINCE the first edition of this book appeared ten years ago the advances in diagnosis and treatment of congenital heart-disease have been so remarkable that Dr. Brown has seen fit to rewrite most of it; his bibliography of over 700 references bears witness to the work this has entailed. For the most part he considers cyanosis a useful guide in classification, and thus follows Abbott; but he points to the tendency in congenital heart lesions towards anatomical adjustment and adaptation. In a useful chapter on differential diagnosis he emphasises the value of the early history, such as routine school-entrance records provide, and a proper appreciation of physical signs. His wide experience of school-children adds weight to the statement that current views on prognosis of the cyanotic group require revision; puberty is not always an adverse factor in such cases, yet the significance of a rising blood-count is serious. He advocates regular periodical observation of children with congenital heart-disease so that cardiac enlargement can be assessed, but he decries an unnecessarily gloomy outlook. Valuable advice is given on the general care of patients, on their education, and on their management when pregnant. Though evidence is conflicting, he firmly believes that maternal rubella in the first three months of pregnancy is so important that therapeutic abortion in such cases is justified.

The many cardiologists and practitioners who have eagerly awaited this second edition will not be disappointed by it.

Chemotherapie der Tuberkulose mit den Thiosemikarbazonen

GERHARD DOMAGK and others. Stuttgart: Thieme. 1950. Pp. 405. D.M.60.

THE object of this work is to review the experimental and clinical results obtained with the thiosemicarbazones in the treatment of tuberculosis. Three chapters are by Domagk: the first two on the bacteriology and pathology of tuberculosis, while well presented, include a number of unjustifiably dogmatic statements; the third gives the experimental results obtained with the drug. The other chapters deal with clinical results in various forms of tuberculosis: skin, upper respiratory, glandular, intestinal, genito-urinary, osteo-articular, and pulmonary (four chapters). Each author gives his own experience; there has been no combined study of dosage and duration of treatment. The best chapters are by Kalkoff, on skin tuberculosis (a remarkable study), and by Malluche, on the local treatment of cavities. In pulmonary tuberculosis the results are suggestive but by no means conclusive, and the work is far from reaching present standards required for the evaluation of chemotherapy. On the other hand the production of the book—the paper, the print, and the quality of the illustrations—surpasses anything nowadays seen in this country.

Essential Urology

FLETCHER H. COLBY, M.D., chief of the urological service, Massachusetts General Hospital. Baltimore: Williams & Wilkins. London: Baillière, Tindall, & Cox. 1950. Pp. 580. 61*s*. 6*d*.

THIS sound book is intended for the senior student. The teaching is essentially practical and good illustrations abound. Few will disagree with the author's condemnation of the various ingenious but dangerous rigid stone-extractors for the cystoscopic manipulation of ureteric calculi, or with his candid admission that many cases of chronic prostatitis are resistant to all known forms of treatment. We confidently recommend the work.

The Alkaloids

Chemistry and Physiology. Vol. I. Editors: R. H. F. MANSKE; H. L. HOLMES. New York: Academic Press. 1950. Pp. 525. $10.

THIS is the first of a series of four volumes, to which it seems that a fifth, on the pharmacology of the alkaloids, may be added.

Volume I is divided into seven sections each written by an expert. The first two deal with what may be called the natural history of the alkaloids: thus R. H. F. Manske describes their botanical distribution, and gives lists of natural orders and botanical families of alkaloid-yielding plants, with charts of these orders, based on Hutchinson's diagram suggesting probable lines of evolution in flowering plants. Manske hints at the possibility of a classification of plants on the basis of their chemical components. He also discusses, evidently from practical experience, the isolation of the mixture of alkaloids usually present in a plant, and the separation and purification of its components. W. O. James surveys critically the results of many workers bearing on the problems of where, how, and why biogenesis of alkaloids occurs in plants. The remaining sections are chemical: all five are written by chemists, primarily for chemists, and as

such are well done. They will be useful to research-workers on alkaloids, and can be cordially recommended to advanced students, being rich in accounts of interesting reactions and of the ingenious methods by which the structures of alkaloids are being determined.

The Health of the People

S. LEFF, M.D., medical officer of health for Willesden. London: Gollancz. 1950. Pp. 288. 12*s*. 6*d*.

"THIS," says the wrapper, "is in effect a comprehensive survey of all aspects of the health, living and working conditions and medical services of the people of this country." But Dr. Leff's conception of "The People" is something much less than the whole population; it is rather an economic class, coterminous, at widest, with the wage-earners and their dependants and contrasted throughout the book with the "well-to-do," with whom they are seen to be in constant and inevitable opposition. The health with which the book is concerned is that neutral state for which we make Ministers and medical officers responsible; good health and the healthy find little mention. Dr. Leff's real subject is rather the relation of the community to those of its citizens who, for one cause or another, need material assistance. He shows very convincingly how lamentably we always have fallen short of supplying the needs of the sick, the poor, the old, the crippled, and, in some respects, the wage-earners of our population. For any who may believe that we have, or have nearly, provided for our dependants, especially for the sick in mind or body, this book should prove a valuable corrective; and it will also administer a cold douche to the *laudator temporis acti*. But not all will feel that the cupidity of the "well-to-do" and the existence of vested interests are almost the sole cause. Are not apathy, dullness of soul, reluctance to face formidable difficulties, and plain laziness—qualities in which no class has a monopoly or even a priority—at least as much to blame? Dr. Leff believes that our present National Health Service may fail to supply the People's needs because of "centralised bureaucracy in Whitehall and bureaucracy of technicians [i.e., 'doctors and specialists'] at all levels of administration." His remedy is reform and revival of local government and the transfer of administrative power from the "technicians" and other appointed members to the "elected representatives of the People." The book would be more persuasive if it were less bitter and harped less on one string.

Der Film als Experiment und Heilmethode

JAROMIR LHOTSKY; Prof. O. PÖTZL. Vienna: Maudrich. 1950. Pp. 136. Ö.S. 30.

THE title arouses expectations which the contents do not satisfy. The first two chapters are concerned with the psychology of films and "the problem of film-experience." The theoretical requirements for experimental application of films to scientific study are then very briefly stated, a chapter on objective methods of recording psychological phenomena is interpolated, and a short account is given of some technical points in cinematography, using 16 mm. film. The study of normal and abnormal psychology by means of the film is then systematically reviewed, but too cursorily to be of value; even the investigations which Dr. Lhotsky himself made in mental hospitals are little more than listed. Allusion is also made to the possibilities of applying the film to vocational selection and "lie-detecting," and the lines of possible development are sketched out. The book is suggestive rather than informative.

A lengthy appendix, by Professor Pötzl, contains an essay which he wrote in 1938 on the comparison of films with dreams. He examines the vivid optic hallucinations of drunkards, which are seen in three dimensions in delirium tremens, whereas when they occur in acute alcoholic psychosis they are two-dimensional. Pötzl carried out tachistoscopic experiments on a patient with this condition, who had had, years before, a hemianopsia from cerebral syphilis: it was possible to excite a series of hallucinatory pictures in the section of the visual field previously affected by the hemianopsia. A number of these tachistoscopic experiments are described, in which dream pictures were evoked; and Professor Pötzl analyses, in an intricate and somewhat obscure argument, the cerebral determinants of the movements and time-relations evident in these visual phenomena.

Traité du pneumothorax extra-pleural

P. LE FOYER and E. DELBECQ with the collaboration of M. Bertheau, M. Bidermann, A. Garnier, L. Giaccardo, and G. Lagraud. Paris: Doin. 1950. Pp. 367. Fr. 2500.

IN this monograph the authors consider all aspects of extrapleural pneumothorax, emphasising perhaps the surgical side, and the complications, rather than the problems of selection, though these are certainly not ignored. It is a comprehensive and thorough work freely illustrated, and for those who do not read French with much accuracy there is a summary in English at the end of each chapter or section. The names and experience of the two authors are sufficient evidence that this is an authoritative work, though naturally it contains views with which other experts would not always agree.

A Short Textbook of Radiotherapy for Technicians and Students

J. WALTER, B.M., M.R.C.P., D.M.R.E., consultant radiotherapist and deputy medical director, Sheffield National Centre for Radiotherapy; H. MILLER, M.A., PH.D., F.INST.P., physicist to the centre. London: J. & A. Churchill. 1950. Pp. 444. 28*s*.

THIS small textbook fulfils its purpose and can be recommended to all radiographers who intend to sit for the Society of Radiographers' certificate in radiotherapy. The physical section gives a lucid account of those parts of a difficult subject which all who use X rays and radioactive substances must not only learn but understand. A short biological and pathological introduction leads to the methods used in treatment. Here it has been more difficult to select suitable material, but on the whole the choice and presentation is good. The initiative of the authors will be welcomed by those who have to teach therapy to radiographers.

Principles of Medical Statistics (London: *The Lancet*. Pp. 282. 10*s*. 6*d*.).—The fifth edition of Prof. A. Bradford Hill's book differs in only one major respect from the fourth. In response to a real need for worked examples of the statistical methods outlined in the main text, he has included a number of questions against which the student can test his understanding. The model answers, which are given in some detail, considerably enhance the didactic value of this addition to a book which has become the standard introductory text on statistics for the medical investigator.

Common Skin Diseases (9th ed. London: H. K. Lewis. 1950. Pp. 505. 25*s*.).—The new edition of this standard textbook by Dr. A. C. Roxburgh contains much new material on anti-histamine drugs, dimercaprol, mepacrine, penicillin dermatitis, and other topics. Work on penicillin and calciferol has been brought up to date, and a note has been added on the use of streptomycin in intractable lupus vulgaris. The book has been thoroughly revised, and the illustrations—some coloured, many plain, and all good—have been augmented by three new ones.

Collected Papers by Sigmund Freud (Vol. 5. London: Hogarth Press. 1950. Pp. 396. 25*s*.).—Edited by James Strachey, these are miscellaneous papers published between 1888 and 1938. The piety of psycho-analysts has ensured that everything written by the founder of their branch of knowledge should be available, in the original German and in translation. It is remarkable that the rather fugitive papers collected in this volume contain so much that is not only of historical interest but enlarges our knowledge of Freud's outlook and illuminates some obscure corners of psycho-analytic theory. Besides encyclopædia articles and other concise expositions, there are random notes, little more than occasional jottings, and considered statements of a problem (as in paper 30, on the termination of analysis). Freud, we are told, once said to an intimate "I am not a Freudian myself." The reader often has cause, in reading these papers, to recognise Freud's freedom from the pedantry and conceit sometimes disclosed in the writings of his followers. In this final volume of the canon he emerges once more as a man of lofty mind, with a constant singleness of purpose in all his studies and reflections.

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** Reference: Guy's Hospital Gazette, Oct. 7th, 1950, p. 380.*

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THE LANCET

LONDON: SATURDAY, JAN. 6, 1951

Peace at Home

LOOKING back over the past five years, we may agree that the main achievement of the Labour Government has been to redistribute the national wealth without using or evoking violence. The war, which made it necessary to increase the social rights of the ordinary citizen, created also the feeling of comradeship that has permitted an increase by consent. Those who were relatively rich, whether in possessions or position, have yielded much with a good grace because they too have thought it right that, in a people so united in adversity, every family should henceforth be sure of help against illness or poverty. Through social security an ideal has been largely realised, and this country no longer consists of DISRAELI's two nations. Yet somehow we lack a corresponding sense of success, of coöperation, of responsibility, and of hope. With world peace in deepening peril our rulers may well find it hard to inspire such hope and unite us in strenuous work to raise the quality of our national life. But sometimes it seems that everyone now sets too little store by unity; indeed that, reversing the usual practice, we engage in controversy at home to take our minds off what is happening abroad.

These generalisations can be applied to the particular case of the National Health Service. We could and should be proud that in troubled times the medical services of this country have not only been maintained but in places already extended; and doctors who have suffered in the process should at least derive some comfort from the knowledge that vast numbers of people are thankful to be able to get medical care without direct payment. Yet few of those who work the service feel that they are taking part in a great new venture in which thought and endeavour will bring steady improvement. Social historians will probably attribute the establishment of the N.H.S. to a masterly mixture of courage and compromise, of planning and improvisation; and they will be astonished that so much was done so fast. But those of us who are living through the social history are conscious more of the soluble problems that remain unsolved, of the faults that remain unrectified, of the limits set on progress, and of the absence of coherent policy. Delays would be tolerated if we were sure of every question being considered on its merits after full examination of the facts by those most likely to understand them; but clearly this ideal state of affairs has not been reached. Where all should be loyally pursuing one aim—to give the public the most useful service that can be devised for the available money—we have instead an atmosphere of conflict, with somewhat arbitrary decisions on one side and a tendency to threats on the other. Moreover the conflict is acquiring a political flavour; for one outcome—and cause—of the maladjustment between the British Medical Association and the Minister of Health is that the chief representative organisation of the profession appears to have abandoned its political neutrality, and thereby prejudiced its status in negotiation. Everyone knows that frank expression of differing opinions is a necessary preliminary to decisions, and it is useless to pretend that differences do not exist; but if the public is to be served, and medicine to be advanced, the Ministry and the profession must work together to that end, and not in general opposition to one another. If it is to acquire the unity it needs, the health service must be kept, as far as possible, out of party politics.

As far as possible. What does this mean? One must admit at once that a service of this kind has to operate within the bounds of political decisions. First and most obviously there is the Chancellor's decision on what sum can be found to finance it. But there are also many others. The proposal, for example, to charge patients for board and lodging in hospital is really a proposal to collect more money from the public for the benefit of the service, and an additional levy of this kind could be imposed only if the Government thought fit. Again, it may seem to the medical profession that the large sums now spent on providing spectacles and dentures could more profitably be used elsewhere—for instance, in enlarging specialist services. But in the last resort it is the function of the Minister, not of the profession, to decide what the public shall be given; and he would be within his rights if he formed the opinion that actually people gain more from being able to bite their food, or read their newspaper (though possibly Mr. BEVAN would not choose this example) than from having a ventriculography or even a thoracoplasty in their last illness. Equally we should be entitled to reply that if the service does not employ diagnostic and therapeutic methods of the latest type, and provide for their development, medicine in this country will stagnate, and in the end the public will be the losers. Likewise we can object to the demand for dentures being met at the cost of a preventive dental service for children. The truth is that the Minister's decisions, though political in the sense that they are not technical, should be based not on what the public wants but on what it *needs*—taking a long view. Though he must bear the responsibility for the decisions, and present them to the Cabinet and the country, he ought to have the help of a body charged with forming and continually reviewing the policy on which the service shall develop, the priorities to be given to its various projects, and the effect of one decision on another. Mr. BEVAN has a remarkable knowledge of the service and has championed it successfully against the Treasury in a way that a less powerful Minister could never have done. The Ministry deserves credit for accomplishing an administrative transformation of quite appalling complexity. But the Minister and civil servants, if left to themselves, may well put public demands before public needs, and they are tempted to solve their urgent problems empirically without reference to a general plan. The recent memorandum on registrars is an example of an important decision taken without enough discussion of its consequences, not least of which has been the alienation of some of the service's strongest supporters and keenest workers.

To give a sense of united effort two things are necessary: first, the representatives of those who work the service must join with the Ministry in forming a development policy against which any proposed action can be tested; and secondly every member of the service must know that all constructive suggestions have attention at a high level. This dual need was recognised in the original scheme, when great significance was attached to the creation of a Central Health Services Council to advise the Minister.[1] But unhappily the council, despite much good work by its standing committees, has so far failed to fulfil its main functions. As it has made no attempt to evolve a general policy, and as its very existence is commonly forgotten, it serves neither as the mind nor as the mouthpiece of the service, though it should be both. For these shortcomings there are two reasons. First, the Ministry has a long record of ignoring its advisory committees, and the Central Health Services Council, modestly disclaiming a position of leadership, has been content to accept the minor, if useful, duty assigned it—that of giving technical advice on single subjects. This handicap might be overcome by a more forceful disposition on the part of the council itself; but we should still be left with the second cause of failure, which depends on principles rather than personalities. The reason why members of the service know little or nothing about the labours of the C.H.S.C. is that its proceedings (apart from an annual report subject to the Minister's censorship) are confidential. The argument in favour of this arrangement is a strong one—namely, that if the council's meetings were public, or if it issued its opinions to the press, the Minister would never feel able to consult it on delicate subjects before a decision was reached, and might well refuse it the full information it must possess if its conclusions are to have weight. Time may show that the advantages of this secrecy are being bought too dearly: it might be more healthy to have a more representative and less confidential council, able to argue publicly with the Minister, so that the reasons for and against his actions would be plain to all concerned. Meanwhile the least the Ministry should do is to give the fullest possible publicity to the work of the council, allowing it to issue frequent statements on the advice it has given, and sometimes to invite expressions of opinion by members of the service on subjects on which it is about to deliberate.

After its inevitably shaky start, the National Health Service badly needs a period of consolidation; and one of the things to be consolidated is the morale of those who work it. If a sense of confidence and purpose and hope is to be created, they must feel that it has a development policy, and that its decisions are based on that policy and on equity—not on hard bargaining, and certainly not on party politics. Moreover, they must understand what the policy is, and be enabled to influence those charged with forming and reviewing it. If the Minister and some of the profession's spokesmen would cease blaming each other for the imperfections of a service which is being constructed with fair success in extraordinarily difficult circumstances, there would be more time for explanation to the participants, both lay and medical, and more pride in what has been done. In determining future policy, the really big issues could be faced more squarely, and we might gradually get rid of the idea that organisation is always something imposed unnecessarily on "us" by "them." The National Health Service is part of this country's endeavour to devise a way of life in which rational planning is combined with a high degree of personal freedom. Such an experiment, we are rightly reminded,[1] is a daring novelty compared with the authoritarian régimes which have been customary through the ages and still dominate half the world. To make it succeed we need more than peace abroad. We need at home the kind of peace that is manifest in discussion without discord.

1. Williams, F. *News Chronicle*, Dec. 28, p. 2.

Treatment of Perforated Peptic Ulcer

"THE perforation of a gastric or duodenal ulcer is one of the most serious and most overwhelming catastrophes that can befall a human being. The onset of the symptoms is sudden, the course rapid, and, unless surgical measures are adopted early, the disease hastens to a fatal ending in almost every instance." Lord MOYNIHAN'S striking words,[2] written a quarter of a century ago, are in the main true today except that surgical measures now have a respectable rival. In the attempt to lower mortality two main lines may be followed: elimination of the faults of operative treatment, and a trial of non-operative measures.

In medicine no treatment can succeed which does not act in concert with the natural curative processes of the body, and the best method of treatment will often be the one which unobtrusively supports and directs these processes and avoids violent and artificial intervention. There is good evidence that the body can seal a perforation in a peptic ulcer by the deposition of fibrin and the apposition of an adjacent viscus—commonly the liver or the omentum. Indeed, most posterior penetrating gastric ulcers have harmlessly perforated, the perforation being, so to speak, walled off before it occurred. But even free anterior perforations not uncommonly seal themselves spontaneously; and the incident can only be inferred from the finding at some subsequent operation of extensive peritoneal adhesions with perhaps encysted cellulose particles, and of an ulcer or its scar adhering to the liver or omentum. In these cases the diagnosis of perforation was never made at the time it took place. It is indeed often very difficult to distinguish clinically between a perforation and a severe attack of ulcer pain. Many orthodox surgeons recognise this type of self-sealing perforation by speaking of a "leaking" ulcer and withholding operation; also operation is regularly withheld from patients with perforated ulcers who are too ill to stand it and occasionally recovery has been reported. The deliberate exploiting of the natural sealing process in patients who are fit for, and according to accepted practice urgently require, operation is, of course, a different matter; but both in this country and in America conservatism of this sort now has its advocates. Among the most persuasive of these is HERMON TAYLOR, who reports in this issue a series of cases treated by what he calls the aspiration method. He maintains that half the operative mortality is due to complications of the operation itself, and that it is

2. Moynihan, B. Abdominal Operations. 1926; vol. i, p. 223.

possible by emptying the stomach and then keeping it empty to prevent any further leak from the perforation and so allow it to seal naturally. If such a course can be shown to be no less successful than operation its advantages are great. Operation should always be avoided if other measures will suffice. Quite apart from fatalities, abdominal operations may cause such complications as incisional hernia (of which "burst abdomen" may be reckoned a fulminating variety) and intestinal obstruction due to adhesions, to say nothing of the inconvenience caused to the surgeon performing a subsequent operation by the scarred abdominal wall and peritoneal adhesions. There is, however, one advantage that a non-operative method might at first sight seem to offer but which the aspiration treatment of peptic ulcer denies us. An experienced surgeon must be at hand throughout the management of these cases and particularly in the first six hours, for in certain circumstances operation must after all be undertaken without further delay. The folly of entrusting the conservative treatment to an inexperienced surgeon is emphasised by STEAD, whose article also appears in this issue; he believes that an inexperienced surgeon will do better to operate provided a good anæsthetist is available.

There are serious objections to this new method of treatment. One of the weightiest is the possibility of mistaking the diagnosis and so failing to operate on cases, such as acute appendicitis, in which early operation is essential. TAYLOR claims that his experience silences this criticism, for he has had only 4 cases in which the original diagnosis of perforated peptic ulcer was later proved wrong. In 2 of these cases the conditions turned out to be of a sort prohibiting or at least not requiring surgery, but in the other 2 a necessary operation was slightly delayed. It may well be, as TAYLOR says, that in these 2 cases the delay in operation made no difference, but few surgeons will feel entirely reassured that on other occasions similar cases might not turn out worse. With the aspiration method the position of the patient seems rather precarious. Like the diver on the bottom of the sea, his life depends utterly on an uninterrupted flow through a long flexible tube. The difficulties of ensuring that aspiration is continuously effective are serious if surmountable; and most surgeons would prefer the single, final stopping of the leak which only operation can secure. Another serious objection —not mentioned by TAYLOR or STEAD—is the necessity of keeping the patient in bed and relatively still for several days while the perforation is sealing. The importance of early mobilisation is now generally recognised, and it must be noted that one of TAYLOR's early cases died of pulmonary embolism. In studying the results of conservative treatment and comparing them with operative results, a serious difficulty must be faced. In an operative series every diagnosis is established by operation: in a non-operative series the diagnosis rests on radiological and clinical findings. Positive radiological evidence can usually be accepted as conclusive; but sometimes this evidence is uncertain; and in about one-third of the cases it is negative. It is true that in many of these cases the presence of an ulcer is subsequently proved, and in some an operation may later show that perforation has taken place; yet in an important proportion of the cases proof of perforation is lacking; and we feel that this somewhat reduces the significance of the mortality figures. The gross mortality of TAYLOR's 101 cases was a fraction under 11%. From other sources he has collected a further 454 cases, and the mortality for the whole series is just under 8%, which certainly compares favourably with most published figures for operative treatment. By analysing the mortality figures and excluding cases moribund on admission and those with other diseases which have contributed to the fatal issue, a net mortality percentage much more favourable to the conservative method may be arrived at; but such adjusted figures are not acceptable. In the contest between rival treatments the prize can be awarded only to the competitor who wins from scratch. The comparisons, moreover, must be contemporary, and it may be misleading to judge the results of conservative treatment against those of surgery in the years before 1945. We may say that the exponents of the conservative treatment have made a case for their method as a safe alternative to surgery, and in particular they have shown how much can be done for the patient who is too ill for operation; and great credit is due to these surgeons for their courage and vision. But they have certainly not yet proved that aspiration is better than suture.

In the last few years there has been a sharp reduction in the mortality of many different abdominal operations, and the suture of perforated peptic ulcer has shared in this improvement. In 1939 SANGSTER [3] reported 100 perforations with 24 deaths; in 1948 he reported 105 with only 4 deaths.[4] At a meeting of the surgical section of the Royal Society of Medicine on Dec. 6, Prof. DIGBY CHAMBERLAIN reported the results of 1622 cases treated during the years 1930–49. The over-all mortality was 17·9% (including the cases too ill for operation), but in the last two years the mortality was only 6% and 7%. The Central Middlesex Hospital [5] results are similar and in some ways more impressive. In the last three years 165 cases were admitted and 11 died—a gross mortality of 6·6%. Although this figure must be accepted as it stands, it is important to note that of the 155 cases operated on only 2 died. AVERY JONES and his colleagues [6] have reported a larger series from the Central Middlesex Hospital which shows how striking was the steady improvement in results over the ten years 1938–48 —and this despite a great increase in the proportion of aged people. It is not possible to demonstrate conclusively what is the cause of this improvement, but there is strong evidence that antibiotics and improved anæsthesia are the main factors, with better postoperative care (including early rising) and advances in surgical technique (such as the avoidance of drainage) also helping. In this country in the past few years the general standard of emergency surgery has been raised by the presence of more surgical registrars in the hospitals, and its results have much improved because skilled anæsthetists, using modern methods including muscle relaxation, are on hand to help them. It remains very doubtful whether conservative treatment, even conducted by an experienced unit, is equally safe for the patient, and we endorse the opinion that, until the facts are clearer, it should be

3. Sangster, A. H. *Lancet*, 1939, ii, 1311.
4. Sangster, A. H. *Ibid*, 1948, ii, 289.
5. Doll, R. Personal communication.
6. Jones, F. A., Parsons, P. J., White B. *Brit. med. J.* 1950, i, 211

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Treatment of Perforated Peptic Ulcer

"THE perforation of a gastric or duodenal ulcer is one of the most serious and most overwhelming catastrophes that can befall a human being. The onset of the symptoms is sudden, the course rapid, and, unless surgical measures are adopted early, the disease hastens to a fatal ending in almost every instance." Lord MOYNIHAN'S striking words,[2] written a quarter of a century ago, are in the main true today except that surgical measures now have a respectable rival. In the attempt to lower mortality two main lines may be followed: elimination of the faults of operative treatment, and a trial of non-operative measures.

In medicine no treatment can succeed which does not act in concert with the natural curative processes of the body, and the best method of treatment will often be the one which unobtrusively supports and directs these processes and avoids violent and artificial intervention. There is good evidence that the body can seal a perforation in a peptic ulcer by the deposition of fibrin and the apposition of an adjacent viscus—commonly the liver or the omentum. Indeed, most posterior penetrating gastric ulcers have harmlessly perforated, the perforation being, so to speak, walled off before it occurred. But even free anterior perforations not uncommonly seal themselves spontaneously; and the incident can only be inferred from the finding at some subsequent operation of extensive peritoneal adhesions with perhaps encysted cellulose particles, and of an ulcer or its scar adhering to the liver or omentum. In these cases the diagnosis of perforation was never made at the time it took place. It is indeed often very difficult to distinguish clinically between a perforation and a severe attack of ulcer pain. Many orthodox surgeons recognise this type of self-sealing perforation by speaking of a "leaking" ulcer and withholding operation; also operation is regularly withheld from patients with perforated ulcers who are too ill to stand it and occasionally recovery has been reported. The deliberate exploiting of the natural sealing process in patients who are fit for, and according to accepted practice urgently require, operation is, of course, a different matter; but both in this country and in America conservatism of this sort now has its advocates. Among the most persuasive of these is HERMON TAYLOR, who reports in this issue a series of cases treated by what he calls the aspiration method. He maintains that half the operative mortality is due to complications of the operation itself, and that it is

2. Moynihan, B. Abdominal Operations. 1926; vol. i, p. 223.

possible by emptying the stomach and then keeping it empty to prevent any further leak from the perforation and so allow it to seal naturally. If such a course can be shown to be no less successful than operation its advantages are great. Operation should always be avoided if other measures will suffice. Quite apart from fatalities, abdominal operations may cause such complications as incisional hernia (of which "burst abdomen" may be reckoned a fulminating variety) and intestinal obstruction due to adhesions, to say nothing of the inconvenience caused to the surgeon performing a subsequent operation by the scarred abdominal wall and peritoneal adhesions. There is, however, one advantage that a non-operative method might at first sight seem to offer but which the aspiration treatment of peptic ulcer denies us. An experienced surgeon must be at hand throughout the management of these cases and particularly in the first six hours, for in certain circumstances operation must after all be undertaken without further delay. The folly of entrusting the conservative treatment to an inexperienced surgeon is emphasised by STEAD, whose article also appears in this issue; he believes that an inexperienced surgeon will do better to operate provided a good anæsthetist is available.

There are serious objections to this new method of treatment. One of the weightiest is the possibility of mistaking the diagnosis and so failing to operate on cases, such as acute appendicitis, in which early operation is essential. TAYLOR claims that his experience silences this criticism, for he has had only 4 cases in which the original diagnosis of perforated peptic ulcer was later proved wrong. In 2 of these cases the conditions turned out to be of a sort prohibiting or at least not requiring surgery, but in the other 2 a necessary operation was slightly delayed. It may well be, as TAYLOR says, that in these 2 cases the delay in operation made no difference, but few surgeons will feel entirely reassured that on other occasions similar cases might not turn out worse. With the aspiration method the position of the patient seems rather precarious. Like the diver on the bottom of the sea, his life depends utterly on an uninterrupted flow through a long flexible tube. The difficulties of ensuring that aspiration is continuously effective are serious if surmountable; and most surgeons would prefer the single, final stopping of the leak which only operation can secure. Another serious objection —not mentioned by TAYLOR or STEAD—is the necessity of keeping the patient in bed and relatively still for several days while the perforation is sealing. The importance of early mobilisation is now generally recognised, and it must be noted that one of TAYLOR's early cases died of pulmonary embolism. In studying the results of conservative treatment and comparing them with operative results, a serious difficulty must be faced. In an operative series every diagnosis is established by operation: in a non-operative series the diagnosis rests on radiological and clinical findings. Positive radiological evidence can usually be accepted as conclusive; but sometimes this evidence is uncertain; and in about one-third of the cases it is negative. It is true that in many of these cases the presence of an ulcer is subsequently proved, and in some an operation may later show that perforation has taken place; yet in an important proportion of the cases proof of perforation is lacking; and we feel that this somewhat reduces the significance of the mortality figures. The gross mortality of TAYLOR's 101 cases was a fraction under 11%. From other sources he has collected a further 454 cases, and the mortality for the whole series is just under 8%, which certainly compares favourably with most published figures for operative treatment. By analysing the mortality figures and excluding cases moribund on admission and those with other diseases which have contributed to the fatal issue, a net mortality percentage much more favourable to the conservative method may be arrived at; but such adjusted figures are not acceptable. In the contest between rival treatments the prize can be awarded only to the competitor who wins from scratch. The comparisons, moreover, must be contemporary, and it may be misleading to judge the results of conservative treatment against those of surgery in the years before 1945. We may say that the exponents of the conservative treatment have made a case for their method as a safe alternative to surgery, and in particular they have shown how much can be done for the patient who is too ill for operation; and great credit is due to these surgeons for their courage and vision. But they have certainly not yet proved that aspiration is better than suture.

In the last few years there has been a sharp reduction in the mortality of many different abdominal operations, and the suture of perforated peptic ulcer has shared in this improvement. In 1939 SANGSTER [3] reported 100 perforations with 24 deaths; in 1948 he reported 105 with only 4 deaths.[4] At a meeting of the surgical section of the Royal Society of Medicine on Dec. 6, Prof. DIGBY CHAMBERLAIN reported the results of 1622 cases treated during the years 1930–49. The over-all mortality was 17·9% (including the cases too ill for operation), but in the last two years the mortality was only 6% and 7%. The Central Middlesex Hospital [5] results are similar and in some ways more impressive. In the last three years 165 cases were admitted and 11 died—a gross mortality of 6·6%. Although this figure must be accepted as it stands, it is important to note that of the 155 cases operated on only 2 died. AVERY JONES and his colleagues [6] have reported a larger series from the Central Middlesex Hospital which shows how striking was the steady improvement in results over the ten years 1938–48 —and this despite a great increase in the proportion of aged people. It is not possible to demonstrate conclusively what is the cause of this improvement, but there is strong evidence that antibiotics and improved anæsthesia are the main factors, with better postoperative care (including early rising) and advances in surgical technique (such as the avoidance of drainage) also helping. In this country in the past few years the general standard of emergency surgery has been raised by the presence of more surgical registrars in the hospitals, and its results have much improved because skilled anæsthetists, using modern methods including muscle relaxation, are on hand to help them. It remains very doubtful whether conservative treatment, even conducted by an experienced unit, is equally safe for the patient, and we endorse the opinion that, until the facts are clearer, it should be

3. Sangster, A. H. *Lancet*, 1939, ii, 1311.
4. Sangster, A. H. *Ibid*, 1948, ii, 289.
5. Doll, R. Personal communication.
6. Jones, F. A., Parsons, P. J., White B. *Brit. med. J.* 1950, i, 211

regarded as an experimental method to be left to those who are making a trial, with full knowledge of the risks, under entirely favourable conditions.

The successful suture or sealing of a perforation is often not the end of the story. According to ILLINGWORTH et al.,[7] within one year 40% relapse (20% severely), and 70% relapse (50% severely) within five years. Moreover hæmorrhage shortly after perforation is an important factor in the immediate mortality. Another serious possibility [8] is the mistaking of perforated carcinoma for a simple ulcer (the distinction may be very difficult to recognise) or the development of carcinoma in a simple ulcer after perforation. The difficulty of diagnosing carcinoma at an operation for perforated ulcer suggests that the majority of carcinomas which perforate are small and have not produced metastases, and are therefore resectable. In such cases postoperative (or post-aspiration) investigations may not suggest the diagnosis of carcinoma, and the dreadful truth will reveal itself too late. These considerations raise again the question of gastrectomy as the immediate treatment of perforation. For years eminent Continental surgeons have advocated this procedure, but British surgeons have not been convinced. Now that the mortalities of gastrectomy and of suture for perforated ulcer have dropped so low, gastrectomy for perforation should perhaps be reconsidered, for it could prevent most of the continued disability from chronic ulcer and some of the deaths from carcinoma.

Bacterial Oddities Produced By Chloramphenicol

ANTIBIOTICS sometimes have odd effects on the shape, size, and cultural characters of bacteria in vitro. In this issue, Dr. VOUREKA, of Athens, working at St. Mary's Hospital, Paddington, describes how her interest in these bizarre forms was aroused by the strange behaviour of urinary bacteria from patients under treatment with chloramphenicol. After a few days of this treatment the urine appeared to be sterile; but if the drug was continued the *Ps. pyocyanea* and *Bact. coli* previously present reappeared in cultures swollen and distorted, producing colony forms widely different from those seen when they were first isolated. Similar morphological oddities have been observed in cultures of other organisms under the action of other antibiotics, and two of the many explanations put forward [9] are: (1) that they are bacterial cells which have lost their ability to divide though retaining their power to grow; and (2) that the antibiotic has interfered with the formation of the bacterial cell wall but otherwise has allowed growth to proceed.

In her second paper VOUREKA describes in-vitro experiments with *Bact. coli* D433, done with the aim of elucidating these observations. Cultivation in broth plus chloramphenicol alone produced bizarrely distorted organisms, but most of their colonies were normal in appearance. When a specific antiserum and chloramphenicol were added to the culture medium the grotesques became still more varied, and pairs or chains of coccal forms were now seen besides the swollen and misshapen ones. Growth was always poor and sometimes invisible, and subcultures on solid media (without antiserum or chloramphenicol) gave a scanty growth distinguished by at least three small colony forms bearing no resemblance to the parent strain. All these exhibited a remarkable stability in up to 200 further subcultures, though there seemed to be an increasing tendency for the colonies to revert to their original size and shape.

The bacterial variation following exposure to antibiotics which has received most attention, because of its practical implications, is the acquisition of drug-resistance. This is now generally looked on not as a mutation but as an effect of the selective survival of the most resistant members of the original population. Since high natural drug-resistance presumably depends on some metabolic peculiarity, it is not surprising that the hyper-resistant organisms occasionally possess minor aberrations in other characters.[10] It is not easy to explain why some of these artificially produced resistant strains retain their resistance through multiple subcultures in a medium free from antibiotic, whereas some do not. VOUREKA's grotesques differ from the original strain in other features besides shape, size, and colony form, and they retain these differences for many generations. Serologically they are almost but not quite identical with their parent. They have lost their virulence for mice but have acquired the ability to ferment some sugars. Their resistance to other inimical substances —penicillin and potassium tellurite—has changed, but the changes are neither constant nor rational. Most surprising of all, far from being less sensitive to chloramphenicol than their parent they are equally or more sensitive. It is difficult to think that changes like these have arisen by the selection of strains better able to withstand the adversity of life with chloramphenicol. VOUREKA ascribes the changes to a true mutation, and though this must be only a guess it is a not unreasonable one. Most of what we know about bacterial inheritance has been seen through several layers of glass, very darkly; but there must be some part of the bacterial cell housing genes that determine its inherited characters. In a hostile but not quite lethal environment it may be possible to effect a change in the genes which will alter the characters of the organism for many generations. Botanists accept as a matter of course the multiplication of genes known as polyploidy effected by the action of colchicine—there was even a chance at one time that the production of penicillin by *P. notatum* could be increased in this way—and similar natural sports, usually sterile, are known as high in the animal kingdom as the mollusca. Perhaps these mutations, if they are such, are commoner than we think. Every day uncountable numbers of bacteria must be brought near to death from phenol poisoning, but few bacteriologists examine the survivors. It may be that such variants are more often seen among parasitic organisms—there is certainly wide variation in the colonial forms of *Bact. coli* recovered in a routine laboratory.

7. Illingworth, C. F. W., Scott, L. D. W., Jamieson, R. A. *Ibid*, 1946, i, 787.
8. Doll, R. *Ibid*, 1950, i, 215.
9. Eisenstark, A., Ward, C. B. jun., Kyle, T. S. *J. Bact.* 1950, **60**, 525.
10. Crofts, J. E., Evans, D. G. *Brit. J. exp. Path.* 1950, **31**, 550. Johnstone, K. I., Crofts, J. E., Evans, D. G. *Ibid*, p. 562. Hunter, M. E., Mudd, S., Woodburn, M. A. *J. Bact.* 1950, **60**, 315.

These stimulating papers will no doubt be followed by further observations on the same lines. Already VOUREKA's work has thrown light into several obscure corners. For instance, two out of three of her variants in the end reverted, partly at any rate, to the parental pattern. It seems to follow that whatever were its characters when it emerged from the bowel, *Bact. coli* D433 has found in captivity the way of life best suited to our artificial culture media.

Annotations

BACTERIUM VERSUS VIRUS

JUST as greater fleas have lesser fleas upon their backs to bite 'em, so pathogenic bacteria going about their lawful occasions in a human host are often plagued by still smaller organisms, the virus particles of bacteriophage, which produce disease in the bacteria and (possibly, sometimes) restrict their activity enough to allow their host to recover. Attempts have been made, though without convincing success, to apply bacteriophages in therapeutics. The existence of a converse antagonism between bacterium and virus is usually ignored. Yet the late Professor Twort remarked, in a popular article, that " In test-tube experiments it is easy to arrange conditions so that a bacteriophage will kill off its host, the bacterium, but . . . it is equally easy to arrange another set of conditions in which the bacterium will kill or inhibit its invading bacteriophage." This article has prompted Mrs. Wooster, in our correspondence columns, to suggest the use of bacteria for controlling virus diseases.

If we take *Bacterium coli* and one of its spherical phages (T6) as examples of the proposed contestants, the dimensions of these organisms, as given by Putnam,[1] are about 2·5 × 1 μ for the bacterium and about 50 mμ for the phage. The contest will therefore be comparable if not to man against flea, at least to man against cockroach. Some pathogenic viruses would be smaller (e.g., poliomyelitis about 10 mμ) and some larger (e.g., rabies and herpes 100–150 mμ) than the coliphage. But the attractive picture of a large anthropoid bacterium chasing an elusive swarm of cockroach-like viruses and finally annihilating them one by one is grossly misleading. The hope would be that the bacteria by their growth and excretions might so modify the phage's environment that its continued existence became impossible. This may be easily done in the test-tube but would be far more difficult in the body, where there are physiological mechanisms to keep the environment constant and any drastic change is likely to do more harm to the host's cells than to the virus. Most viruses, such as those of poliomyelitis or hepatitis, are embedded in the tissues, where it would be undesirable if not impossible for bacteria to pursue them. Perhaps viruses which attack cells on exposed surfaces, like herpes or the viruses causing respiratory infections, would be more accessible; but a further difficulty would be that the virus particles live and multiply *inside* the cells and exist outside only in the brief periods of passing from one cell to another. Invasion of the tissue cells by bacteria, even if they come as well-meaning scavengers, is not a contingency that anyone will contemplate with equanimity.

However, before we condemn the proposal out of hand, we should perhaps recall how ridiculous it would have seemed, not many years ago, to enlist the help of green moulds in combating puerperal fever or pneumonia; yet *Penicillium notatum* was soon to be our most valued ally. We in England sometimes accuse our American cousins of allowing enterprise to outstrip judgment—of wasting too much time, effort, and money in exploring fool ideas that any sensible Englishman could have told at the start were unsound and impracticable. But now and again some fool idea, British or American, leads to a brilliant discovery; and the sensible Englishman is left to ponder whether his vaunted critical faculty is really such a reliable guide after all.

1. Putnam, F. W. *Science*, 1950, **111**, 481.

SOME TUBERCULOSIS FIGURES

To say we are neglecting the tuberculous is to pluck monotonously at a single string; possibly we can appreciate the note more fully by attending to its overtones. Dr. F. J. W. Miller,[1] bringing up to date his figures already published,[2] reports that, in Newcastle upon Tyne in the ten years 1939–49, tuberculosis was the greatest single cause of death in childhood; that deaths of children formed almost 10% of the total mortality from this disease; and that tuberculosis is responsible for nearly a quarter of all deaths between the ages of one and fifteen years. This might be less serious than it sounds if the Newcastle death-rate from tuberculosis was low; but it is high compared with that of the country as a whole, having been, in 1949, 75 per 100,000 population for respiratory tuberculosis—against less than 50 for England and Wales. Dr. Miller illustrates the undue loss of children by comparing the figures for Newcastle (population 270,000) with those of Ealing and Acton (population 212,000): in Newcastle, in 1942–45 inclusive, 1177 people died of tuberculosis, 130 of them being children; in Ealing and Acton only 450 people died, of whom 18 were children—giving respective rates of 48 children and 8 children per 100,000 population. Moreover the death-rate in Newcastle, as compared with such other large cities as Birmingham and Manchester, is especially high among children of school age. Dr. Miller infers that the high childhood mortality means the presence of a large number of infective adults in this overcrowded city.

In Glasgow the picture is possibly more sombre still. Dr. Stuart Laidlaw[3] notes that the number of new cases of pulmonary tuberculosis notified in 1949 was 2829—the highest figure recorded since 1910—and that 540 (19%) of those affected were children under the age of fifteen. There were, moreover, 12,000 people on the tuberculosis register—3000 more than before the war. Again overcrowding must be a potent factor in the spread of the disease, for " more than half the families in Glasgow are living in one-or-two-apartment houses." What life in such conditions means, in terms of proximity, is illustrated in the Newcastle report, where the spread of an ordinary respiratory infection through a tenement is described.

> In this house rooms were let to 7 families, who combined to make a total of 13 adults, 6 children aged two to five, and 3 infants. A baby living in an attic with her parents developed pneumonia; four weeks later her mother—much given to visiting her neighbours—developed a cold. At the same time a three-year-old on the ground floor developed bronchitis, while a few days later her infant sister had pneumonia. A family of 4 on the same floor all developed respiratory illness, and soon afterwards another baby in the house developed pneumonia, while her mother followed suit with a sharp cold.

It is not difficult to apply the moral of this story to a more serious infection. The point is brought home even more forcibly by Dr. Laidlaw's study of the home conditions of 2674 Glasgow patients with pulmonary tuberculosis: 1300 of these—nearly half—shared their beds with others; only 444 had a bed to themselves, and only 930—just over a third—had a room to themselves. Domiciliary treatment can hardly hope to succeed in

1. Annual Report of the Medical Officer of Health for 1949. Newcastle upon Tyne. Pp. 217.
2. *Lancet*, 1949, ii, 274.
3. Annual Report of the Medical Officer of Health for 1949. Glasgow. Pp. 302.

such conditions, and protection of contacts becomes a mockery. The acute need for more treatment beds in Glasgow is illustrated by the statements that, in spite of the rise in incidence, the number of cases under treatment in hospitals and sanatoria was no greater than in 1948, and that though there were only 351 deaths in institutions, as compared with 486 in 1948, this was mainly because advanced chronic cases could not gain admission. They were at home, of course, sometimes infecting others.

These two reports remind us tellingly that tuberculosis is a social disease. In overcrowded cities we can only hope to check its widening course by providing more houses or more beds—but preferably both.

STERILISATION LAWS

THE sterilisation of certain classes of mentally or eugenically defective patients, which recurs, along with euthanasia, as a subject for ethicomedical debate in England, has been practised in the State of North Carolina since 1933, when the General Assembly regularised an earlier measure which had been ruled unconstitutional on appeal. Woodside gives an account [1] of this experiment in action which is likely to interest both the opponents and the advocates of eugenic sterilisation.

The North Carolina sterilisation law is a fair specimen of American State eugenic legislation. Under it, sterilisation proceedings may be initiated by the head of any State penal or charitable institution, or by the county senior welfare officer; and action is mandatory upon these officials if a written request is presented by the next-of-kin or guardian of the patient. The Eugenics Board, which administers the hearing of petitions for sterilisation, may act only in cases of mental disorder, feeblemindedness, or epilepsy. (Voluntary sterilisation at the request of the normal patient is left to the discretion of the surgeon and has nothing to do with the eugenic laws.) Detailed medical and social reports and the sworn consent of the patient, unless he or she is a minor, an inmate of a State mental institution, or of unsound mind ("certified"), are required. No other eugenic or social reasons are recognised. Failing the consent of the relatives, action can proceed at the discretion of the board, but with full rights of appeal to the superior court of the county, and only minors or the insane can be sterilised without their own consent. Appeal to the courts, while it is the normal democratic safeguard, is possibly less adequate than Woodside suggests, since the appellants are almost uniformly feebleminded and underprivileged; but, as she points out, the use or abuse of the law depends on the spirit in which it is carried out, and the North Carolina law has not so far produced any flagrant injustice. In this respect it is less open to criticism than other American State laws which prescribe compulsory sterilisation for delinquents and sexual deviants, sometimes without reference either to the non-hereditary nature of the complaint or to the emotional attitudes of courts.

Since 1907, when Indiana introduced a sterilisation law, 49,207 sterilisations have taken place in the United States, 2152 being in North Carolina. Most of these cases were among the group likely to benefit most, the feebleminded. To the high-grade female defective, incapable (as is often the case) of learning or maintaining contraception, sterilisation may mean a freer life, since the administrative argument for inpatient confinement is removed, while for the community the eugenic benefit is evident. Woodside cites work done by herself and Eliot Slater confirming the tendency to consortive mating in the unintelligent; and with defectives this is even more prominent. While many defectives are incapable, both biologically and psychologically, of safe parenthood, they may none the less be capable of proving happy and affectionate wives, and it is doubtful whether the restriction of rights involved in voluntary sterilisation is anything like as grave as that implied by restrictions on the "emotional contacts of the female patient" on licence from English institutions.

One extraordinary feature of the North Carolina scheme is that only institutions with surgical facilities can really apply it at their discretion; for no funds exist for extramural operations. On the wider issue, Woodside describes the possibilities of voluntary sterilisation in relation to current attitudes and prejudices in the public: North Carolina has remarkably advanced provisions for contraceptive instruction, but many patients seem unable to take full advantage of them and benefit greatly by sterilisation once its nature and purpose, together with its lack of effect on sexual performance, have been explained to them. In multiparæ in poor health or bad economic circumstances, sterilisation increases orgasm capacity in proportion as it reduces fear of conception.

Studies of this type provide informative material on which to base our own views of the future of sterilisation. Most English workers would feel that the legal denial of voluntary sterilisation to the individual is irrational, and that sterilisation of high-grade defectives, based on persuasion, is eugenically desirable. Compulsory powers will always, however, be rightly suspect in this country, especially when they are used, or may be used, to provide an easy administrative answer to a psychiatric problem. Some of the American States have already provided experience from which we may be able to profit as time goes on.

1. *Sterilisation in North Carolina.* By MOVA WOODSIDE, research assistant, Institute for Research in Social Science, University of South Carolina. London: Oxford University Press. 1950. Pp. 236. 20*s*.

SERUM NEURITIS AND RELATED CONDITIONS

THIS year, apparently typical anterior poliomyelitis has been described in children inoculated within the previous 3–4 weeks with pertussis vaccine or with a mixture of this and diphtheria toxoid [1]; and in the majority of these cases paralysis was maximal in the limb which had been inoculated. A statistical study [2] confirms that during the 1949 epidemic this phenomenon was too common to be attributed to chance.

Since Thaon's [3] report in 1910, atrophic palsy of one or both shoulder-girdles has been recognised as a rare complication of the administration of serum.[4] Serum neuritis has most commonly followed injection of tetanus antitoxin, but it has also been seen with diphtheria antitoxin and other sera. The clinical course is fairly uniform, starting usually 5–10 days after administration of the serum. At the onset there may be serum-sickness and urticaria. Severe pain is felt in the region of the scapula and upper part of the arm. The pain lasts from a few hours up to a few days and is accompanied by atrophic paralysis of some of the shoulder-girdle muscles and at times slight sensory changes, usually on the outer side of the upper arm. The distribution of the muscle involvement is usually radicular; the muscles supplied by C5 and C6 roots are commonly involved, but sometimes isolated muscles alone are paralysed, and the condition may be bilateral. Winkelman [5] has recorded four similar cases with onset 7–14 days after smallpox vaccination. Usually serum neuritis is ascribed to allergic œdema of the perineural tissues; but this explanation is unproved.

1. McCloskey, B. P. *Lancet*, 1950, i, 659. Martin, J. K. *Arch. Dis. Childh.* 1950, **25**, 1. Geffen, D. B. *Med. Offr*, 1950, **83**, 137.
2. Hill, A., Knowelden, J. *Brit. med. J.* 1950, ii, 1.
3. Thaon, P. *Sem. méd. Paris*, 1910, **30**, 513.
4. Allen, I. M. *Lancet*, 1931, ii, 1128. Kennedy, F. *Amer. J med. Sci.* 1929, **177**, 555. Woolling, K. R., Rushton, J. G. *Arch. Neurol. Psychiat.* 1950, **64**, 568. Thompson, A. R., Tombleson, J. B. L. *Brit. med. J.* 1940, i, 1015.
5. Winkelman, N. W. *Arch. Neurol. Psychiat.* 1949, **62**, 421.

The problem of serum neuritis became more complicated during the late war when a number of cases were reported. Thus from the Middle East Burnard and Fox [6] and Spillane [7] recorded the condition (under the name of localised neuritis of the shoulder-girdle) as occurring without administration of serum; in his forty-six cases Spillane found no time-relation between the administration of vaccines or sera and the development of paralysis. Weinstein [8] recorded sixteen similar cases among American military personnel; again in none of these had serum been administered within the previous three months, but all had had prophylactic injections of typhoid or typhus vaccine 1–12 weeks before the onset of the illness. Parsonage and Aldren Turner [9] reported on 136 cases of the same condition, to which they gave the purely symptomatic name of neuralgic amyotrophy. The record of previous inoculations was investigated in 67 of these; the number inoculated within the preceding four weeks was 11, of whom 6 had been inoculated within the previous fortnight. They found, however, that in no less than 66 of the 136 cases the condition had developed intercurrently in hospital. Cases of neuralgic amyotrophy without any time-relation to serum or vaccine administration are still occasionally seen in this country and have also been reported from Scandinavia [10] and France.[11]

This condition and serum neuritis differ in several ways from anterior poliomyelitis. The onset is afebrile and is not accompanied by the constitutional and meningeal symptoms of poliomyelitis; the pain at the onset is severe and localised, which is on the whole uncommon in poliomyelitis, where pain is usually more generalised even though the subsequent paralysis is localised; commonly sensation is impaired, particularly in the distribution of C5 segment; and the cerebrospinal fluid (C.S.F.) has been normal in the majority of cases where it has been examined in the acute stage. The pathology and ætiology of neuralgic amyotrophy remain obscure; but the clinical picture is exactly comparable to that of serum neuritis, and probably the two disorders have a similar basic pathology. Since there is a possibility that neuralgic amyotrophy may be precipitated by vaccine inoculation, care should be taken, and the C.S.F. examined, before atrophic paralysis following inoculation is attributed to anterior poliomyelitis.

ON THE RECORD

THE Royal College of Physicians has published in book form the reports of its fifteen special committees which sat between 1942 and 1947 to consider a wide range of subjects of public and professional importance.[12] These have already had considerable influence, and some of them should have more. The one on medical education was notable as a bold effort to free the curriculum from the accretions of ages, and in general from the obsession that a doctor cannot be safely loosed on the public unless he has had lectures on every conceivable subject—though he need *understand* nothing. This report was responsible for the "pre-registration resident year," which is in due course to be introduced under the new Medical Act; but the college seems to have had in mind an assistant residentship, or scarcely paid post under the supervision of a senior resident; whereas nowadays the scheme is generally regarded merely as a means of ensuring that before undertaking independent practice all doctors shall hold a house-appointment. The report on the design of dwelling-houses starts off in rather pessimistic vein, but in its latter half it proceeds to some first-class social medicine. Taking them all round, the reports are further evidence that the Royal College of Physicians, when it is given the chance, can rise to the occasion as a source of sound well-considered advice. In his introduction, Lord Moran, president from 1941 to 1950, points to its long record of service of this kind, which we hope and believe will continue and increase.

DISSEMINATION OF THE MENINGOCOCCUS

IN both world wars cerebrospinal fever (meningococcal meningitis) became epidemic among recruits in Service establishments. This, together with advances in the serological typing of meningococci and the advent of chemoprophylaxis, led Aycock and Mueller [1] to make a long and continuous study, from 1941 to 1945, of carrier-rates in relation to the incidence of the disease in two American army establishments.

Thirty years ago Glover [2] postulated a rise in the meningococcal carrier-rate to 20% as a pre-epidemic danger-point, and suspected a relation in the army between this rise and overcrowding in sleeping-huts. During the inter-war period, however, Dudley and Brennan [3] found that in Naval establishments persistently high carrier-rates (54%) might obtain without clinical attacks; and clinical attacks occurred despite very low carrier-rates. Furthermore, carrier-rates were as high among senior ratings with spacious quarters as among recruits whose sleeping accommodation was much inferior. Early in the late war Fairbrother [4] suggested that fatigue was more important than overcrowding in predisposing to clinical attacks, especially among recruits from rural districts, whose natural immunity was likely to be low.

Aycock and Mueller discount altogether the effect of overcrowding. They found that the disease is fairly uniformly distributed throughout the U.S.A. during years of high and low prevalence alike. Plotting of reported cases during the period 1915–48 showed an undulating curve of increases and decreases, each extending over a period of 6–11 years, with peaks in 1918, 1929, 1936, and 1943. This rhythmical variation is a continuing phenomenon, and is not due to independent seasonal epidemics, since the rhythm during the epidemic season varies with that in the inter-epidemic summer months. But the pattern of periodicity differs from that of such "immunising infections" of childhood as measles, chickenpox, and diphtheria. With these, an epidemic is terminated by the "exhaustion of susceptibles" and recurs only when enough non-immunes have once again accumulated. Thus Aycock and Mueller deny that natural immunity following exposure shapes the epidemic pattern of meningococcal meningitis; season is responsible, they find, only for secondary fluctuations in the longer cyclic curve, and there is no single cause for either.

Using a method for prolonging the viability of the meningococcus on nasopharyngeal swabs, similar to that described by Downie,[5] these workers have compared the carrier-rate of various serological types among seasoned troops and recruits; and they suggest that the carrier-rate among the latter may represent that of the civil population—a view later supported by swabbings of Harvard medical students. In the two military groups the total carrier-rates and their type-composition were essentially the same, and there was no indication of the seasonal variation which obtains for clinical attacks. But, whether in the army or the civilian population, type-composition is not stable; the carrier-rate for one type may increase while the rates for other types are stationary or declining. Aycock and Mueller believe that these changes, which are not sudden or frequent, are natural

6. Burnard, E. D., Fox, T. G. *N.Z. med. J.* 1942, **41**, 243.
7. Spillane, J. D. *Lancet*, 1943, ii, 532.
8. Weinstein, E. A. *Arch. Neurol. Psychiat.* 1947, **57**, 369.
9. Parsonage, M. J., Turner, J. W. A. *Lancet*, 1948, i, 973.
10. Hook, O. *Nord. Med.* 1949, **42**, 1662.
11. Alajouanine, T., Thurel, R., Blatrix, C. *Rev. neurol.* 1950, **82**, 279.
12. A limited number of copies are available on application to the college.

1. Aycock, W. L., Mueller, J. H. *Bact. Rev.* 1950, **14**, 115.
2. Glover, J. A. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 50. 1920.
3. Dudley, S. F., Brennan, J. R. *J. Hyg., Camb.* 1934, **34**, 525.
4. Fairbrother, R. W. *Brit. med. J.* 1940, ii, 859.
5. Downie, A. W. *Lancet*, 1940, ii, 36.

"reversals," the mechanism of which is unknown—a hypothesis akin to that of McLeod,[6] who has suggested that the different cultural types of *Corynebacterium diphtheriæ* may be cyclical mutations. An increase in the epidemic type-I meningococcus results from changes in carrier composition and is correlated with the occurrence of meningitis; but the persistence of a single type in individuals exposed to other types suggests the operation of some general factor in the host. All agree that the relatively high incidence of the disease in the army is due largely to the influx of recruits; but Aycock and Mueller found no evidence that the carrier-rates differed greatly between recruits, seasoned soldiers, and civilians.

This susceptibility of recruits to clinical attack is evident only during the first few months of service; of 3507 cases of meningitis, 78·6% occurred in men with less than six months' service and 57·6% in men with less than three months' service. It would therefore not be unreasonable to suppose that Fairbrother was right in attaching importance to fatigue as a contributory factor in attacks among recruits. Fortunately sulphadiazine (and other of the newer sulphonamides) is effective not only in prevention and treatment but also in securing prompt termination of the carrier state. As the result of trials, Aycock and Mueller suggest that the administration of 8 g. of sulphadiazine to recruits upon arrival at the depot would ensure a refractory state throughout the period of greatest risk.

AMERICAN HOSPITALS

DESPITE a large Federal construction programme, the U.S.A. is still not within sight of achieving the number of hospital beds it needs. State plans show [7] that at the start of 1950 the country had a total of 1,099,493 beds, of which 162,598 were rated as "non-acceptable"; to replace these and meet the full demand a further 867,833 beds were needed. The upper limits within which the States formulated their estimates were: for general-hospital beds 4·5–5·5 per 1000 population; for mental-hospital beds 5 per 1000 population; for tuberculosis beds 2·5 per average annual death in the State over the five-year period 1940–44; and for chronic disease 2 beds per 1000 population. The wide discrepancies between different States are reflected in the figures for tuberculosis. Whereas Minnesota, at the top of the scale, had 2·96 "acceptable" beds per annual death, Alabama, at the bottom, had only 0·38; the national average was 1·43, and in only six States was 2·5 exceeded. (The estimates include beds in hospitals under construction.) These figures do not, of course, indicate the existing special need for more hospitals in the less thickly populated parts.

TISSUE CULTURE OF HUMAN ENDOMETRIUM

THE technique of tissue culture in artificial media has been known for many years, and it is, therefore, surprising that it has not been used more extensively in physiological and pathological research. Randall and his associates [8] seem to be the first to have adopted the technique of Parker [9] and of Medawar [10] for the culture of human endometrium in a fluid medium—a method which permits simultaneous study of the effect of the tissue on the medium and of the medium on the tissue. Endometrium is a particularly suitable tissue for this type of work; it is easily obtained fresh and in quantity by curettage, and it undergoes certain well-defined morphological and functional changes which are only partly understood and whose explanation would be of definite clinical value.

6. McLeod, J. W. *J. Path. Bact.* 1950, **62**, 137. See *Lancet*, Dec. 2, 1950, p. 693.
7. Cronin, J. W., Reed, L. S., Baney, A. M. *Publ. Hlth Rep., Wash.* 1950, **65**, 1461.
8. Randall, J. H., Stein, R. J., Stuermer, U. M. *Amer. J. Obstet. Gynec.* 1950, **60**, 711.
9. Parker, R. C. *Science*, 1937, **85**, 292.
10. Medawar, P. B. *Quart. J. micr. Sci.* 1948, **89**, 187.

Randall and his colleagues have already obtained some striking results. Thus they found that, whereas proliferative endometrium required, for proper growth, nearly 80% oxygen and 5% carbon dioxide, secretory endometrium survived quite well even under anaerobic conditions. The optimum pH corresponded with these findings: 7·3–7·6 for proliferative endometrium, and 6·7–6·9 for secretory endometrium. Reduction of the temperature greatly prolonged the survival-time of the explanted tissues; control cultures kept at 37°C began to show evidence of degenerative changes after 10 days, but cultures kept at 4°–5°C were histologically normal even after 35 days. On the other hand, at this low temperature no mitoses were seen in proliferative endometrium, whereas in cultures kept at 25° or 34°C they were numerous. This work opens up a vista of possible studies—e.g., on the effects of hormones on the tissue and its products (which might, incidentally, offer a very neat method of assaying progesterone); the effects of vitamins, amino-acids, and inorganic ions; the changes which accompany menstruation; and the development of inflammatory conditions.

SYNTHESIS OF COMPOUND F

COMPOUND F has been synthesised by research chemists of Messrs. Merck & Co., New Jersey. This, says the *New York Times* (Dec. 29), was announced at the annual meeting, in Cleveland, of the American Association for the Advancement of Science. Like 'Cortisone' (Compound E), which was synthesised in the same laboratories, Compound F is made from desoxycholic acid; the process is completed in 39 stages, compared with 37 for cortisone. Hitherto only small amounts of compound F have been available for trial [1]; but it is thought to have much the same action as cortisone. The Merck chemists state that, given the necessary equipment, substantial amounts of compound F can be produced within a matter of months.

NEW YEAR HONOURS

OF eight members of our profession receiving knighthoods, two are fellows of the Royal Society. Dr. Gordon Holmes has long had so great a name in neurology that a prefix seems almost irrelevant; and the work on viruses done in Professor Burnet's institute in Melbourne is known throughout the medical world as that of a mind which can kindle ideas as well as illuminate facts. Mr. Kelsey Fry, with his distinguished record in the Guy's dental school and as dean of the faculty of dental surgery at the Royal College of Surgeons, has aided the Royal Air Force and the Ministry of Health as consultant. Dr. Selwyn-Clarke, who is appointed K.B.E., is one of the few doctors in the Colonial Service who have become senior administrators: during the war he had the difficult post of director of medical services at Hong-Kong, and his recent efforts, as governor of the Seychelles, to improve the conditions of the people, have likewise called for courage. Also on the Colonial Office list are Dr. F. A. Ibiam (honorary K.B.E.) and Dr. K. A. Abayomi, both of them members of the executive council of Nigeria, and both Scottish graduates. In the Royal Victorian Order, Dr. Daniel Davies and Dr. F. H. Teale are promoted to knighthoods for personal services to the Sovereign and his household. Dr. Davies's skill as a clinician is based not only on large experience but on patient investigations into the clinical aspects of the pneumonias, anæmias, and dyspepsias; while Dr. Teale, as former lecturer in bacteriology and head of the immunotherapy department at University College Hospital, has worked on problems of bacterial infection. The list we print on p. 47 contains also the names of many other men and women who are already honoured in their profession but whose public recognition is none the less welcome to their colleagues.

1. See Fourman, P., Bartter, F. C., Albright, F., Dempsey, E., Carroll, E., Alexander, J. *J. clin. Invest.* 1950, **29**, 1462.

Special Articles

EARLY AMBULATION

A SURVEY OF HOSPITAL PRACTICE*

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ALTHOUGH it is normal in almost every ward to find some ambulant patients, the scale of provision for their needs appears often to have been very arbitrarily estimated. As a result, many patients are kept in bed, are washed in bed, and have to continue to use bedpans for a longer period than their condition requires.

ARGUMENTS FOR EARLY AMBULATION

A patient's progress through the hospital depends very largely on his doctors, who decide how soon he should be allowed up. Some variations in policy are to be expected, but there is at present an exceptional divergence of views. This has resulted from the development over the last half-century, in the United States and in this country, of the medical practice known as "early ambulation." Some doctors have adopted this practice, and others have partially adopted it, while many maintain the traditional régime.

In 1899 Emil Ries advocated early ambulation after vaginal cœliotomy. He claimed several advantages for getting his patients out of bed within 24–48 hours of operation. According to him their recovery was more rapid and more complete and they were able to leave hospital 4–6 days after operation. He even stated that they were able to work the day after they went home, which would meet with very little support nowadays. (Nearly 50 years later, we find that de Soldenhoff (1948), in Ayrshire, though he gets his patients out of bed early, insists on a period of recovery in hospital before sending them home.)

Apart from the work of Boldt in America in 1907 and of Hartog (1909) and Kummell (1908) in Germany, little was published on the subject of early ambulation until 30-odd years later.

Harry Nelson (1944) was struck by the excellent healing and low incidence of postoperative complications in children who were unrestrained after operation. "In my practice," he states, "the term early always represents the 72-hour period immediately following operation . . . the majority of pulmonary complications develop well within this period."

Early Ambulation and Related Procedures in Surgical Management, by D. J. Leithauser (1946), published in Chicago, is based on $7^1/_2$ years' experience of early rising and a series of over two thousand cases. Leithauser gets his surgical patients up as soon as they come round from the anæsthetic which may be 3–4 hours after operation; by the end of 24 hours most of them have been out of bed several times. He does not consider that the later periods of 48 hours, 72 hours, and even 4 days after operations, permitted by others, are so effective.

Schafer and Dragstedt (1945) emphasise that early rising is now possible only because of improvement in surgical technique. They let their patients up on the 1st to 3rd postoperative day.

Reports by gynæcologists include that of Trice (1947) and Steinhart (1946). Trice held that there were only two contra-indications to early ambulation—namely, clinically profound shock and prediction of fatal outcome. Steinhart concluded among other things that early ambulation in gynæcology reduces the usual postoperative invalidism, both psychically and physically, and results in more rapid convalescence. Bryant E. Cullen (1947) stated that the fear of casualties during the London blitz prompted obstetricians to allow patients to get up in 24 hours and to go home on the third day. No ill effects resulted from such treatment. Less nursing care was required for the early risers, and they had a more rapid and comfortable convalescence. de Soldenhoff (1948), Rotstein (1944), and Swarbreck (1950) have all reported favourably on the practice of early rising in obstetric patients. de Soldenhoff and Rotstein both allowed their patients to get out of bed on the 3rd or 4th day. Swarbreck does not think the practice suitable for domiciliary cases because the patient's "urge to meet her domestic obligations is irresistible." The *British Medical Journal* (1950) states that "early rising has now become accepted practice in some obstetrical units, not only after normal delivery but also after uncomplicated forceps extraction and cæsarean section."

Hunter et al. (1945) concluded that the most important ætiological factor in phlebothrombosis of the lower extremities is simply confinement to bed: on occasion phlebothrombosis may occur within 2 days after beginning bed rest.

In the opinion of the *Lancet* (1944) absolute rest is seldom wise in the treatment of the aged.

Paul Wood (1950), during a discussion on the management of rheumatic fever, said: "There is no evidence that the natural course of the disease can be influenced in any way, and precious little that it is greatly influenced by rest. However, it is up to those that believe that physical effort does no harm in the active phase of the disease to prove their point before we can be expected to give up so obvious a remedy." Bywaters (1950) also points out that the evidence that rest minimises residual cardiac damage is scanty. D. M. Dunlop (1949), said in a lecture to postgraduate students: "I have no hesitation in getting patients out of bed after an attack of acute rheumatism once the temperature and sleeping pulse and physical signs in the heart are normal, arthritic pain absent, and the sedimentation-rate within normal limits for a fortnight—even though this may involve getting some patients out of bed within a very few weeks of the onset of their disorder. I have no reason to regret this practice, nor do I consider it necessary to keep all cases of coronary thrombosis in bed for as long as six weeks. . . . complete rest in bed should be prescribed like a potentially dangerous drug, and not instituted as a matter of course for all hospital patients until the contrary has been ordered."

One of the most outspoken critics of bed rest is Asher (1947): "Look at a patient lying long in bed. . . . The blood clotting in his veins, the lime draining from his bones, the scybala stacking up in his colon, the flesh rotting from his seat, the urine leaking from his distended bladder, and the spirit evaporating from his soul."

The *Lancet* (1947) expresses the opinion of many doctors in this country that, though patients may be kept in bed to take the strain off the wound, "the greatest strain to which a recently sutured abdominal wall or inguinal canal can be put is in trying to defæcate into a bedpan. . . . Most men when they realise that recumbency must be paid for in wasted muscles and prolonged convalescence get up on the fourth or fifth day; few do so earlier of their own accord."

AN ACCEPTABLE RÉGIME

In the light of these opinions, it is possible to forecast with some confidence the type of régime likely to be acceptable to the medical profession in this country if the merits of early ambulation are accepted in principle.

This cannot be exactly defined, since individual judgment on the proper treatment of each case must remain necessary. It is, however, possible to postulate a standpoint which, while accepting the principle of early ambulation, allows the use of physiotherapy and bed exercises as substitutes for the extremes of forced early ambulation. In this paper, "early ambulation" should be interpreted in this sense.

EARLY AMBULATION AND EARLY DISCHARGE

Those who practise early ambulation claim that their patients are fit to leave hospital at an earlier date than others not subjected to this régime. Leithauser, for example, estimates an average reduction by half in the

* This survey was undertaken as part of the investigation into the Functions and Design of Hospitals being sponsored by the Nuffield Provincial Hospitals Trust and the University of Bristol.

length of stay of his hospital patients, and argues that the traditional physician or surgeon may not only keep his patients long in bed, but may also be compelled to keep them longer in hospital for repair of their wasted muscles and recovery from their general weakness. On the other hand, many doctors who get their patients up early are reluctant to discharge them until they have had a period of convalescence in hospital. This is particularly necessary in the case of obstetric patients, who on discharge tend at once to take up strenuous household duties.

If there were a full positive correlation between ambulation and discharge, the policy adopted would clearly not affect the proportion of ambulant patients in hospital but would affect only the capacity of the hospital in terms of patients treated in a given time. But there is not a full correlation between the two, as I shall show, and the effect of an early ambulation policy is therefore to increase the proportion of ambulant patients.

The Present Survey

STANDARDS

In the present investigation the technique adopted was to examine patients actually in a number of hospital wards and to assess their capacity to get up and look after themselves. In view of the controversy on the merits of early ambulation, it was decided that two assessments were necessary: (*a*) from the standpoint of a doctor practising early ambulation; and (*b*) from the standpoint of a doctor of the traditional school.

Patients were placed in three categories. These are more or less arbitrary, but each has direct planning implications and corresponds with a distinct phase in the cycle of recovery.

Category I.—The bedfast. (Patients who require intensive nursing and are unfit to get out of bed.)

Category II.—The partially ambulant. (Patients able to leave their beds to wash and use the water-closet, who do not normally require a bedpan. Meals are brought to them in bed. The nursing attention which they require is not on the intensive scale of category I patients.)

Category III.—The fully ambulant. (Patients able to get out of bed, normally unaided, and generally up for hours at a time. They still require nursing care but not as much as category II patients.)

In the first attempt to assess patients in this way the staff of the Bristol Royal Infirmary generously coöperated. The resident medical officer and the sister attached to each of 4 wards accompanied me round, and every patient was considered in turn by this panel of three. Full details of the clinical condition of the patient were obtained, and assessment was made in full knowledge of any complications or deviations from normal displayed by him. The assessment was made from the standpoints of the early ambulationist and of the traditionalist. In this first study no record was taken of the actual ambulation status of the patients; this was later recognised as a serious omission, and in later surveys a record was made of the actual stage of ambulation which patients had attained at the time of the visit. It also became apparent that a proportion of patients examined would already have been discharged under a régime of early ambulation. Their inclusion under category III thus tends to exaggerate the proportion of ambulant patients. It was therefore decided to include in future records a fourth category of "out."

In the main survey the original technique was followed and in all wards—except two in Edinburgh—I was accompanied by a doctor conversant with the condition of the patients and by the ward sister. In most cases the doctor was a senior registrar, but in some hospitals more senior members of the medical staff came round with me. On the whole it appeared that the registrar had the merit of knowing the individual patients and had also enough experience of his own specialty to appreciate what alternatives in treatment and ambulation policy were feasible. He was at the same time less likely than the senior man to have developed firm convictions one way or the other on the merits of early ambulation.

After a little experience it was found not unduly difficult to project one's mind into that of advocates of the two schools of thought. The three categories of ambulation were also fairly straightforward to identify, although it was at times not easy to place marginal cases.

TABLE I—GENERAL SURGERY: 155 PATIENTS

Category:	I Bedfast (%)	II Partially ambulant (%)	III Fully ambulant (%)
Actual régime	50·3	20·0	29·7
Early ambulation ..	16·4	35·0	48·6
Traditional	66·7	17·3	16·0

Some trouble was caused by the need to decide how many patients would have been discharged under a régime of early ambulation. While it was possible to determine with some confidence the number of patients who on "medical grounds" could have been discharged, it was clear that external considerations—such as home conditions—would have made some such discharges impossible. While allowance for external factors could not in the circumstances be made for each individual patient, the reasons given for retaining in hospital some patients who could have been discharged under the actual régime suggest that the crude figures based on medical grounds alone would have to be halved in practice.

Conversely, some allowance in the "traditional" assessment is necessary. The discharge policy of a traditional régime would in nearly every case have been more cautious than that actually adopted, with the result that a ward run on traditional lines would have contained patients—normally in category III—who had, in practice, been discharged. If this fact were ignored, the number of ambulant patients in a traditional ward would be underestimated.

In the whole survey, twenty-nine wards, accommodating a total of 836 patients, were examined. These

TABLE II—GENERAL MEDICINE: 167 PATIENTS

Category:	I (%)	II (%)	III (%)
Actual régime	53·3	24·6	22·2
Early ambulation ..	25·7	28·3	46·1
Traditional	61·1	13·9	25·0

were divided into clinical departments as follows: eight general surgical wards (230 patients); eight general medical wards (237 patients); six gynæcological wards (185 patients); five obstetrical (antenatal and puerperal, 147 patients); and two ear, nose, and throat wards (37 patients). These wards were in eight hospitals, of which five were teaching and three non-teaching. Two of the hospitals were in Scotland. All were of the acute general type with no special provision for long-stay cases.

RESULTS

The material collected in the early part of the survey was later found to be incomplete, and was therefore rejected. In most cases, the different wards of a given

type were sufficiently alike for the data from them to be pooled. The exceptions were the two E.N.T. wards, which differed considerably—either in their practice or possibly in the type of patient admitted. One general surgical ward appeared to practise a high degree of early ambulation compared with the other wards of the same type. Leaving these exceptions on one side we were left with a sample of 522 patients drawn from twenty-one wards, distributed as follows: six general surgical wards (155 patients); six general medical wards (167 patients); four gynæcological wards (109 patients); six obstetrical wards (antenatal 41 patients, puerperal 50 patients). The estimates finally obtained, after adjustment, are set out in tables I–V.

Table I shows that under early ambulation the number of bedfast patients in the general surgical wards would be reduced to less than a third of the present value, and the number of fully ambulant patients would be increased by about two-thirds. The data also suggest that the adoption of early ambulation would give an increase of about 10% over the current rate of throughput.

Table II shows that under early ambulation the number of bedfast patients in the general medical wards would be reduced to rather less than half the present figure, and the number of fully ambulant patients would be more than doubled. Here it seems that the adoption of early ambulation would give an increase of nearly 10% over the actual current rate of throughput.

In the gynæcological wards (table III) the number of bedfast patients would be reduced under early ambulation to little more than a third of the present figure and the number of fully ambulant patients would be nearly doubled. An increase of about 10% over the current rate of throughput could be expected.

TABLE III—GYNÆCOLOGY: 109 PATIENTS

Category:	I (%)	II (%)	III (%)
Actual régime	46·8	33·0	20·2
Early ambulation ..	16·2	45·5	38·4
Traditional	55·7	31·0	13·3

The materials for the estimate in table IV are less abundant and conclusions must be accepted with caution. It appears, however, that with early ambulation the number of bedfast patients would be reduced to less than half the present figure and the number of fully ambulant patients would be nearly trebled. The increase in throughput might be nearly 15%.

In interpreting table V caution is again needed. It can, however, be stated that with early ambulation the reduction in bedfast patients would be considerable—the table suggests a reduction of three-quarters—while the number of fully ambulant patients would be nearly doubled. The corresponding increase in throughput would apparently be about 20%.

Statistical Fluctuation

It will be appreciated that the percentages shown in all the above tables are average values. Where they are based on reasonably large totals—say, 100 or more—they are of adequate reliability. But it should not be overlooked that even if the above percentages had absolute accuracy as averages, there would be considerable day-to-day variation in an actual ward—this variation being larger with smaller wards. In a small ward one must therefore be prepared for much larger fluctuations in the numbers of patients falling into the three main categories than would be the case for large wards.

TABLE IV—OBSTETRICS (ANTENATAL): 41 PATIENTS

Category:	I (%)	II (%)	III (%)
Actual régime	46·3	36·6	17·1
Early ambulation ..	22·2	27·8	50·0
Traditional	65·2	19·6	15·2

TABLE V—OBSTETRICS (PUERPERAL): 50 PATIENTS

Category:	I (%)	II (%)	III (%)
Actual régime	48·0	26·0	26·0
Early ambulation ..	11·9	38·1	50·0
Traditional	60·4	24·5	15·1

For a given size of ward it is possible, from the above data, to make estimates of the degree of variation to be expected. This may have considerable influence on the selection of a satisfactory ward-size.

Increase of Throughput

For various types of ward, we estimate from the available data what proportion of patients would have been discharged under early ambulation. Suppose in a given case this is 20%. Then only 80% of the actual patients in the ward would remain; and it can be shown that, if early ambulation reduces the length of stay of all types of patient in the same ratio, the relative change in throughput is given by $1/0{\cdot}8 = 1{\cdot}25$ (i.e., an increase of 25%). In practice it is unlikely that all lengths-of-stay would be reduced in the same ratio, but without a detailed discussion of the distribution of length-of-stay and the differential effect of early ambulation on various types of patient it is impossible to say exactly what kind of modification is required. However, the simplifying assumption of *constant* reduction of length-of-stay, adopted in this report, is felt to give an important indication of the general order of improvement to be expected.

Discussion

During this survey of 836 patients in eight hospitals I had the opportunity of discussing early ambulation with the medical and nursing staffs, and as occasion arose with patients. Most of the doctors professed to believe in a modified form of early ambulation. In the same hospital there was often a considerable difference in the practice of ambulation in different wards. The opposition, such as it was, came mainly from gynæcologists. There was a sharp difference of opinion as to whether a pelvic-floor repair should spend 21 days in complete bed rest, or whether she might get out of bed within 3–4 days of operation. One gynæcologist assured me that the last thing she would allow her patients to do soon after operation was to stand by the bedside and cough.

Obstetricians on the whole were keen to have their cases out of bed early, but emphasised the patients' need of rest before going home to perform household duties. Surgeons appeared to prescribe early ambulation more than any other class of doctor. Emphasis was laid on the necessity for first-class technique. I was told that early ambulation was not suitable for the less proficient surgeons, and that good anæsthesia must accompany good surgical technique. It was also pointed out that physiotherapy and exercises in bed can, in the opinion of some doctors, obviate the necessity for rising from bed in the first 24–48 hours. I was often told that if enough lavatories were provided close to the patients, far more of them would be allowed out of bed at an early stage.

Physicians on the whole tended to be more conservative. They had not the same enthusiasm for early

ambulation, and, perhaps because there is no starting-point for treatment corresponding with an operation, the tendency was towards rest in bed while there was any doubt. There were exceptions; thus, in the medical wards in two hospitals about half the patients were "up" in spite of the fact that the average ward-age at the time of observation was less than for medical wards elsewhere. In another hospital the practice of early ambulation and short stay appears to have been partly attributable to there being many consultants, each with only a few beds which he naturally tried to put to the fullest use. In addition there were facilities for transfer of convalescent cases to other hospitals.

The practice of early ambulation at first imposes a heavy strain on nurses, but later it eases the burden. I have seen two nurses straining to keep a cholecystectomy patient upright on the edge of her bed. She was of the "fair, fat, fertile, and forty" type, weighing possibly 16 st., and as she swayed from side to side looking miserable it was all that they could do to prevent her from falling on the floor. The initial effort to get a postoperative patient up is not always easy.

Once early ambulation is established, the patient can take the responsibility for his intimate hygiene and so relieve the nurses of some of their work. On the basis of the figures obtained in this survey, if we compare the number of patients actually bedfast with the number who would be bedfast under the practice of an early-ambulationist, we find that on average about two-thirds of those patients at present using bedpans in surgical wards would be liberated. From my discussions, I am convinced that surgeons would welcome this, and very little objection from patients may be anticipated.

Closely related to the problem of bedpans is the problem of bathing. In the hospitals which I visited it was usual to find one bath for 20 patients or perhaps two for 30. I was assured in one hospital that every ambulant patient was expected to have a bath, which would be entered in the "bath book." As baths were only permitted on the ninth day in this maternity ward, the number of potential bathers was not very large. In another ward even colostomy patients bathed themselves and the number of baths provided was considered inadequate. It seems clear that at present there are not enough baths to meet the needs of patients, and that if early ambulation were to be practised more, the bathing facilities would have to be increased accordingly. Perhaps because of the very inadequacy of bathing facilities in most existing wards the matter is given up as a bad job. During this survey, in frequent visits to wards at all times I have never found an occupied bathroom.

Summary and Conclusions

For more than fifty years early ambulation has been intermittently advocated by members of the medical profession. During the war years expediency forced many doctors to adopt it in varying forms. Around 1944 many papers on the merits of early ambulation were published in America; and in 1946 the appearance of Leithauser's book stimulated others to follow his example, though often they modified his technique.

In the present survey 836 patients in eight acute general hospitals were assessed, mostly under three heads: (*a*) their actual stage of treatment and ambulation, (*b*) the stage of treatment and ambulation which they would have reached under the care of a doctor practising early ambulation, (*c*) the stage of treatment and ambulation which they would have reached under the care of a doctor of the traditional school.

In the wards studied, great variations were noted in the length of rest prescribed, and in the precipitancy with which patients were raised from their beds after operation, childbirth, or illness. The practice of early ambulation in modified form was commonly observed. Reliance is often placed in physiotherapy and bed exercises, as a substitute for the early rising advocated by Leithauser.

It was clear that many more patients would be permitted to "rise early" if the necessary facilities were provided. Those partially ambulant would require more lavatories and bathrooms; and a full régime of early ambulation would call for increased sitting-up space and dining facilities. Moreover, early ambulation throws an initial strain on the nursing staff and for this reason some of the patients observed in the hospitals were not up as soon as the surgeon wished.

From the results of this survey the following tentative conclusions are reached:

1. A very strong case can be made for the practice of early ambulation, provided the necessary surgical and technical skill can be attained.
2. In the great majority of wards studied, the normal practice still approximates much more closely to a traditional than to an early ambulation régime. Although the ambulation policy has affected surgical and gynæcological wards more than medical wards, the former still appear to offer a greater relative scope for its extension.
3. It can be inferred from the figures that, if the practice of early ambulation prevailed, 70–90% of patients in the types of wards covered would require the use of basins and water-closets, and 40–55% would require day-space. These percentages may be contrasted with the present 45–55% requiring the former and 15–30% requiring the latter facilities. It should be emphasised, however, that very few hospitals are equipped to provide for even these current percentages.
4. An important secondary consequence of early ambulation is the increased effective capacity of the hospital resulting from reduction in the length-of-stay necessary. The data suggest an increase in the rate of throughput varying from about 10% in medical and gynæcological wards to 20% in obstetrical (puerperal) wards.

I am very grateful to the late director of research, Mr. John Madge, M.A., A.R.I.B.A., for assistance and advice. Other team members, particularly Mr. Norman T. J. Bailey, statistician to the department of human ecology, Cambridge University, and Dr. Barbara Duncum, D.PHIL., also gave me valuable help which I wish to acknowledge. Permission for publication of this article has been granted by the Committee controlling the investigation.

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NEW YEAR HONOURS

THE list of honours published this week contains the names of the following members of the medical profession:

K.C.V.O.

DANIEL THOMAS DAVIES, C.V.O., M.D. Wales, F.R.C.P.
Physician to H.M. Household; physician to the Royal Free Hospital, London.

FRANCIS HUGO TEALE, C.V.O., M.D. Lond., F.R.C.P.
Formerly lecturer in bacteriology and immunotherapy, University College Hospital Medical School.

K.B.E.

PERCY SELWYN-CLARKE, C.M.G., M.C., M.D. Lond., F.R.C.P.
Governor and commander-in-chief of the Seychelles.

K.B.E. (Honorary)

FRANCIS AKANU IBIAM, O.B.E., M.B. St. And.
Member of the executive council, Nigeria.

Knights Bachelor

KOFOWOROLA ADEKUNLE ABAYOMI, M.D. Edin.
Member of the executive council, Nigeria.

FRANK MACFARLANE BURNET, M.D. Melb., SC.D. Camb., PH.D. Lond., F.R.A.C.P., F.R.S.
Director of the Walter and Eliza Hall Institute; professor of experimental medicine, University of Melbourne.

WILLIAM KELSEY FRY, C.B.E., M.C., M.D.S. Durh., M.R.C.S., F.D.S. R.C.S.
Dean of the faculty of dental surgery, Royal College of Surgeons of England; consulting dental surgeon Guy's Hospital, London.

GORDON MORGAN HOLMES, C.M.G., C.B.E., M.D., SC.D. Dubl., D.C.L. Durh., F.R.C.P., F.R.S.
Consulting physician, Charing Cross Hospital, and National Hospital, Queen Square, London.

C.M.G.

CLIFFORD CRAIG, M.D., M.S. Melb., F.R.A.C.S.
Surgeon-superintendent, Launceston General Hospital, Tasmania.

C.V.O.

GEORGE PROCTOR MIDDLETON, M.V.O., M.B. Aberd.
Surgeon apothecary to H.M. Household, Balmoral.

C.B. (Military)

Surgeon Rear-Admiral KENNETH ALEXANDER INGLEBY MACKENZIE, B.M. Oxfd, K.H.P.

Major-General THOMAS YOUNG, O.B.E., M.B. Glasg., K.H.P., late R.A.M.C.

C.B.E. (Military)

Air Commodore VYVYAN STEWART EWING, M.B. St. And., R.A.F.

C.B.E. (Civil)

JAMES BOYD, M.D. Belf., F.R.C.P.I.
Chief medical officer, ministry of health and local government, Northern Ireland.

Miss LUCY MEREDITH BRYCE, M.B. Melb., F.R.A.C.P.
Hon. director, blood-transfusion service, Victoria.

JOSEPH STANLEY HOPWOOD, M.B. Lond.
Superintendent, Broadmoor Institution.

PETER JAMES KERLEY, M.D. N.U.I., F.R.C.P., F.F.R.
Director, radiological department, Westminster Hospital; adviser on mass radiography, Ministry of Health.

GEOFFREY MARSHALL, O.B.E., M.D. Lond., F.R.C.P.
Principal medical referee, Civil Service Commission; consulting physician to Guy's Hospital, London.

KAMIL MOHAMED ARIFF BIN KADIR MUSTAN, L.M.S.
For public services in the Federation of Malaya.

ADAM RANKINE, M.C., M.B. Glasg., lately Colonial Medical Service.
Director of Medical Services, Mauritius.

VINCENT BRIAN WIGGLESWORTH, M.D. Camb., F.R.S.
Director of the unit of insect physiology, Agricultural Research Council.

O.B.E. (Military)

Lieut.-Colonel JOHN ALISTAIR MANIFOLD, M.R.C.S., R.A.M.C.

Wing-Commander HENRY LINDSAY ROXBURGH, M.B. Edin., R.A.F.

O.B.E. (Civil)

JAMES FANSTONE, M.D. Lond.
Surgeon and founder, Hospital Evangelico Goiano, Anápolis, Brazil.

THOMAS GILRAY, M.B.
Medical practitioner at Napier, New Zealand.

JOHN ALEXANDER JAMES, CH.M. Sydney, F.R.C.S., F.R.A.C.S.
Surgeon and physician, Australian Capital Territory.

ALEXANDER CAMERON MCKILLOP, M.B. Edin.
Senior assistant physician, New Zealand State Asylum Service.

WILLIAM HUGH CLIFFORD PATRICK, M.D. N.Z.
Regional medical officer, Ministry of Health.

MOHAMED ALI RANA, M.B.E., M.R.C.S.
For public services in Kenya.

ANDREW JAMES SHINNIE, M.D. Aberd.
M.O.H. for Westminster.

DON SAM DE SIMON, L.R.C.P.E.
Superintendent, Leprosy Hospital, Hendala, Ceylon.

SINNATAMBY SUBRAMANIAM, L.R.C.P.E.
For medical and social services in Ceylon.

ALLAN ROBERT STANLEY VICKERS, CH.M. Sydney.
For services to the Flying Doctor Service in Australia.

LEON JAMES WILLIAMS, M.D.
For public services in Bermuda.

M.B.E. (Military)

Major HAMILTON JAMES ELVERSON, B.M. Oxfd, R.A.M.C.

Surgeon Lieut.-Commander WILLIAM BOYD JACK, B.M. Oxfd, R.N.

Major TERENCE RICHARD JANSEN, L.R.C.P.E., Ceylon Medical Corps.

Surgeon Lieutenant TREVOR STANSFIELD LAW, M.B. Lpool, R.N.

M.B.E. (Civil)

ARTHUR GRIFFITHS FARR, M.B. Camb., Colonial Medical Service.
Acting senior medical officer, Tanganyika.

SAMUEL FERGUSON FLOYD, M.B. R.U.I.
General practitioner, co. Down.

Miss AGNES GRACE GILLESPIE, M.B. Lpool.
Missionary, Mary Calvert Holdsworth Memorial Hospital, Mysore.

JOHN JAMES SPARKS, M.D. McGill, F.A.C.P.
British vice-consul at Coatzacoalcos.

FRANCIS HENRY WHITEHEAD, M.R.C.S.
Chairman, Wandsworth and Battersea war pensions committee.

Bar to A.F.C.

Wing-Commander HUGH PATRICK RUFFELL SMITH, A.F.C., M.B. Camb., R.A.F.

A.F.C.

Squadron-Leader JOHN STAFFORD HOWITT, M.R.C.S., R.A.F.

Personal Papers

PATIENT'S PROGRESS

WHAT are the functions of an almoner? I had been working as one for two weeks and I still wasn't sure, when one day in April, 1947, Peggy hobbled into my office on two sticks. Lank grey hair framed her colourless face. Her eyes peered owlishly from behind large round spectacles. She seemed highly nervous, rather dull, and rather deaf. She had very little to say for herself and she seemed very much under the influence of Mrs. Bullock,* who accompanied her. Mrs. Bullock was a large, well-dressed, loud-voiced, overpowering woman, who, when asked if she was a relative or friend, announced that she was "one of the Good Samaritans of this world." So the Good Samaritan, protesting loudly, was asked to wait outside while I tried to sort out the difficulties that might arise when Peggy came into hospital for the cup arthroplasty to her hip. This is generally a two-year job, and at that time meant three months in hospital, several weeks wearing a walking-iron, a long convalescence, and then a possible work readjustment. This programme often creates financial and domestic problems, and I wanted to talk to Peggy about her particular difficulties undisturbed. The interview was a complete failure. Peggy was too afraid to speak, and to my chagrin I had to ask the Good Samaritan to come back. She held forth at length about her own virtues, and implied that Peggy lived with her as a friend, for whom she was

* Names throughout this article are fictitious.

accepting responsibility. She avoided the question of whether the patient was an employee. Peggy, she said, had done a little work for her, but was not working for her now.

I was far from happy about the pair. They didn't fit together, and the patient was so dreadfully nervous. But the queue outside the door was long, and I knew I should have time to get to know Peggy when she came into the ward.

Nearly two months later she came into the orthopædic ward and I saw her next day. She still seemed too nervous to talk, but said she liked working for Mrs. Bullock and would not change for anything in the world. Her operation was postponed a week, which gave me a chance to make friends with her. Finally she broke down and admitted she did not want ever to go back to Mrs. Bullock.

* * *

She could not remember her mother, but until she was 10 she lived with her father, two brothers, and a sister in Manchester. When she was 10 her father went to America and she and her two brothers went to live at an orphanage. When she was 16 she left and went to work for Mrs. Bullock, whose household consisted of eight people. Although her relatives tried to get in touch with her they were discouraged, and she was not allowed to see them or communicate with them.

She was now 44 and for the last 30 years she had worked very hard. Her hours were long and she had no life to call her own. She had scarcely any time off. When she did occasionally go to the cinema, her times of going out and coming in were strictly supervised. She was paid 10*s.* a week. During the war her mistress was not allowed to keep two maids. There was apparently another wretched downtrodden maid, so Peggy had to go out to work. She was employed by two or three local women to do domestic work for a few hours a day, but she still had to work for Mrs. Bullock before she went out and after she came in. At one point she revolted and ran away to one of her other employers, but Mrs. Bullock followed her and threatened the other employer to such an extent that Peggy returned. For her outside work she was paid 30*s.*, but Mrs. Bullock deducted £1 and left her 10*s.* out of which she had to pay her N.H.I., leaving about 7*s.* for all her needs. After all these years she had £10 in the bank and a few Savings Certificates. While she was waiting to come in for her operation she was sent to spring-clean the country cottage, and the day before her admission she washed blankets.

* * *

This story seemed fantastic, but I contacted one of the women for whom Peggy had worked, and she confirmed it. She too seemed a little frightened of Mrs. Bullock, who had told her she was not to visit Peggy in hospital as anyone except Mrs. Bullock upset the patient! Peggy's panel doctor, who had sent her to the hospital, said he believed my suspicions to be correct. He had had to make special arrangements to see the patient when she was supposed to be out at work.

The first thing to be done was to get Peggy to pluck up enough courage to decide not to go back to Mrs. Bullock. This was no easy task, as every time I got her to the point Mrs. Bullock would visit her and play on her emotions to such an extent that she would weaken again. Matters were finally brought to a head when I wrote to Mrs. Bullock, asking her to see me to discuss certain difficulties and at the same time to let Peggy have her savings book, clothing coupons, &c. Evidently realising that something was afoot, she did not reply. Eventually, having laid in wait on visiting days for several weeks, I managed to meet her in the ward. There was an unhappy scene, which was impossible to avoid, and Mrs. Bullock left threatening me with legal action for attempting to coerce Peggy to leave her. However, she apparently thought this over and decided to throw in her hand. She sent Peggy her belongings, which were not worth having, and we never heard of her again.

Now that Peggy had had her pillar of strength removed she became very dependent on me, and my next big task was to give her a sense of independence. I started by successfully tracing some of her family, and for weeks I would find odd people turning up at my office saying they were relations. The effect on Peggy was amazing and her delight was touching to see. She began to have faith, realised that she was not entirely friendless, and started to build up hope for the future.

She had only done domestic work and she had not the mental ability for anything more complicated. It was thought that she would be fit to go on with this kind of work eventually, so we promised to help to find her a suitable residential post when she was fit. She then decided she would like to work for the hospital—a stage which quite a lot of patients go through. I did not think it was a very good idea, for I was afraid she might remain too dependent on me; but I did not at that time want to rob her of her sense of security and thought she would have plenty of time to change her mind. An interview was arranged with the domestic supervisor, who said she would be able to find Peggy a suitable job when the time came.

By the end of September, 1948, Peggy could just walk with a walking-iron. At the beginning of October I took her to a convalescent home where she could have physiotherapy, and she stayed there several weeks. On her return she spent a weekend with one of her relatives in London and came to the outpatient clinic for a check-up. Then she went to stay with relatives in Manchester until after Christmas, when it was thought she would be ready to start work. During her stay in Manchester physiotherapy was arranged for her locally at a reduced fee, which the relatives were able to pay.

* * *

It was a changed Miss Meekins who came to see me at the clinic at the end of January. I hardly recognised the self-assured vision with sparkling eyes. She looked at least 20 years younger, her face generously made up and hair waved. There was also a coy air about her which I found puzzling until in a rush of confidence she confessed that she was now a betrothed woman about to become a bride in March. So that accounted for the strange letter I had received that morning asking me to give some unknown person a reference on her with a view to a proposed engagement. In my ignorance I had interpreted the letter to mean that she had found a job and that she would not need the post that was about to be offered to her at our Seaview convalescent home. There are moments when it is difficult to contain one's curiosity, and by devious means I discovered that she had met her fiancé by answering an advertisement in the *Evening News*. He was a steady church-going man, widower, and male nurse, at present out of work, but approved by her relatives.

I advised her to take the job at Seaview for the time being, which she did. Gradually she began to leave off her walking-iron and have less treatment. Although at first her letters were frequent and demanding, these gradually lessened. The engagement fell through, and we had to deal with a broken heart; but it healed fairly quickly and I did not hear from her for long intervals. At one point there were suspicions that she was guilty of petty thefts, but she got over this too. Two years after I first met her I decided that she was thoroughly rehabilitated, for the only news I had was that she was getting around well and I ought to see her running down the drive to meet her latest boy friend. I believe she became engaged to a bus-driver at Seaview at this time.

In October, 1949, Miss Meekins turned up again, having got herself a job at a hospital as doctors' maid at a better salary. She was beginning to feel rather tucked away in such an out-of-the-way place as Seaview. Three months later, the almoner of that hospital rang to say that

Miss Meekins had been ill and had had an operation, and they had sent her to a convalescent home. When she left she went to stay at a hostel and then, suddenly, all who knew her lost track of her.

* * *

Six months later she walked into my office looking very smart and rather condescendingly told me that she had at long last contacted her long-lost father, who was a retired estate agent in Philadelphia, and he was coming over to fetch her back to live with him. I found that she was working as a housekeeper in Pimlico, having found the job herself. She brought her father to see me when he arrived—a dapper little man in a panama hat. I must confess I had wondered if there was anything phoney about this move, but the family likeness was too strong for there to be any doubt about his identity.

So Miss Margaret Meekins, of independent means, sailed to the U.S.A., first class, on Aug. 17, 1950.

The Wider World

FIJI REVISITED

Sir PHILIP MANSON-BAHR
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I HAVE recently revisited the Fiji Islands after a lapse of forty years. Naturally, there have been great changes. A good road now encircles the main island of Viti Levu; large numbers of cars are to be seen in Suva, the capital; and everywhere the standard of living is high. The Indians, who in 1910 were sugar-plantation labourers, are now landowners on a considerable scale, and a great deal of the trade of the islands is in their hands. Under a paternal government they enjoy full privileges, including free schooling and hospital treatment. The Fijians, who in 1911 were a race only recently come under British rule, are now a civilised, highly organised community in whose ranks doctors, native medical practitioners, dentists, administrators, teachers, and all manner of technicians are to be found.

Their very diseases have also changed. Bacillary dysentery, which in 1910 I went out to investigate and which was then rampant, has practically disappeared. I found at that time that Shiga's bacillus was spread mainly by the ubiquitous house-flies;[1] but now, probably owing to better sanitation and the application of D.D.T., the number of flies has greatly decreased and so has the incidence of bacillary dysentery. Since 1943 a Mosquito Control Service, which was originally organised and directed by a remarkable layman, the late D. W. Amos, has been in operation in the islands. The Fijians employed in this service acquire a specialised knowledge which enables them not only to recognise various species of mosquito but also to distinguish their larval characteristics. So efficient has been their work that in the main island of Viti Levu filariasis has largely disappeared.

In 1910 I was able to demonstrate[2] the transmission of the filaria of the Pacific, *Wuchereria bancrofti* var. *pacifica*, by a new species of mosquito, now known as *Aëdes scutellaris* var. *pseudoscutellaris* Theob.—an insect which has peculiar breeding habits, frequenting mostly small pools of water, discarded tins, crab holes, and coconut shells. By eliminating these reservoirs the numbers of these mosquitoes in the vicinity of houses have been much reduced. It has also been found that cutting the grass and clearing the bush around the native houses, or *buris*, interrupts the parasitic cycle by eliminating resting-places of this mosquito after it has been engorged with human blood.

In recent years a number of subvarieties of this main species have been separated in various islands of the Pacific, one of which—*A. scutellaris* var. *horrescens* Edw.,[3] a forest-frequenting form—has been recognised. This variety breeds mostly in collections of water in the axils and branches of forest trees and in tree holes, whereas the first named is associated with cultivated areas and human habitations. The larvæ of these two varieties are quite distinct, those of *horrescens* being covered with hairs and thereby easily recognised, though the adult females are identical.

It appears probable, from what I was able to accomplish, that *horrescens* is incapable of transmitting the human filaria. This is important, because any systematic measures against this forest-loving species would be impossible to carry out. Here, then, is a pretty problem to be solved—namely, what is the substance or agency which endows a particular variety of mosquito with the property of transmitting the filaria worm?

Unfortunately, there is much pulmonary tuberculosis among the Fijians, as has been made evident by mass-radiography. Tuberculosis, filariasis, yaws, typhoid, and paratyphoid are the chief scourges of these people, and probably any sanitary measures taken against one of them would have some effect against the others. The rebuilding of native houses on modern lines and the provision of a good water-supply and general sanitation are now being vigorously undertaken.

Kwashiorkor, or malignant malnutrition, has lately been discovered in undernourished and neglected children in the back areas of the main island. It is odd that these isolated cases have come to light when the general nutrition of the natives stands at a high level. Undulant fever of the abortus type has also recently been discovered, and much more work requires to be done on fevers of short duration hitherto lumped together under the diagnosis of dengue.

Many channels for research remain unexplored so far, for want of specially qualified doctors. For instance, the bacteriological collection contains over 100 strains of the salmonella group waiting to be classified; and there are interesting possibilities for hæmatological research in a peculiar form of megalocytic anæmia which is prevalent among the island-born Indian population and which appears to have a seasonal incidence. In the wards of the Colonial War Memorial Hospital in Suva, medical practice is concerned with a medley of cases such as were seen in this country over a century ago. Since systematic necropsies have been conducted, many hitherto unsuspected diseases, such as rheumatic carditis, have come to light.

Dr. J. M. Cruikshank, the principal medical officer, is a far-seeing administrator who gives great encouragement to any of his officers who show an inclination for study outside the usual routine. The Central Laboratory in Suva is a most efficient institution, and the technical ability of the Fijian and Indian assistants, under the able direction of Mr. J. E. Pery-Johnson, has to be seen to be believed.

By some, Colonial officials are regarded as swathed with red tape; but as far as Fiji is concerned nothing could be further from the truth. I know well that anyone with qualifications to undertake medical research work would be welcomed and would be given every assistance. For those with the pioneering spirit and keen and inquiring minds the opportunities are great.

The chance is not given to everyone to recommence a piece of work on which he was engaged so long ago, and I am grateful for being allowed to go to Fiji and once more work under my own steam, so to speak. During my four months' stay many courtesies and privileges were afforded me by the Governor, Sir Brian Freeston, and by the Fiji government and its officers. They gave me not only laboratory accommodation but every facility I needed for my research. Everyone, I might say, whether within the government or without, joined in helping me.

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In England Now

A Running Commentary by Peripatetic Correspondents

THEY do things in style north of the border. On a recent visit to a Scottish university my fellow traveller and I (we wore blue, not red, ties) were invited, unexpectedly and in spite of our state of undress, to attend the biannual dinner of the Medical Faculty. An impressive gathering of the professoriate, including at least two knights, bade us welcome, and dinner jackets were accompanied by boiled shirts and fly-away collars —none of your modern soft fronts and turn-me-downs. After the aperitifs we sat down to a traditional Scotch dinner, with the Dean, the essence of bonhomie, seated in his high chair in the centre. First there was Scotch broth, with carrots intult and neeps intult and all the other "intults" that so intrigued Queen Victoria. Then strange noises were heard from the kitchen, and presently a piper in full-dress regalia swung into the dining-hall, followed by the chef holding aloft a sonsy haggis, that chieftain of the puddin' race. After the dish had been piped round the table and the chairman had stabbed it fiercely with a dirk, the piper was rewarded with his glass of whisky—it was a large whisky and he a young student, so he may be forgiven for not draining the glass at a gulp—and the company proceeded to wash down this tasty morsel with the same Highland dew. With turkey and cranberry sauce we drank a fine claret, that Scottish symbol of the Auld Alliance. Then came the plum pudding, followed by mince pies and then a mushroom savoury. After the toast of the King, the vintage port was circulated (clockwise, of course), and its mellowing influence brought forth a succession of pawky stories, capped by one from the Dean about an Aberdeen plumber who, weary of life, decided to end it all; they found him in the kitchen with one end of a gas-pipe in his mouth and the other end fixed to the company's side of the gas-meter. And so into the cold wintry night. But one felt that in Scotland at any rate a professor still has some standing—and an appreciation of the good things of life.

* * *

Among the more entertaining of our uninvited, though none the less welcome, guests at the clubhouse when we held our Christmas party was the resident engineer. Dressed unobtrusively in a sports coat and grey bags he oozed inconspicuously into the bar at 8.30 P.M. and stayed there. In my capacity as host I didn't really get around to him till about 12.50 A.M., by which time he was feeling fine. He began by offering me two or three pounds to pay for some of the whisky he had drunk. I liked the "some." "Don't like spending all time in bar," he explained, "rather dance but can't; knee trouble." I expressed sympathy. "You're doctor," he went on, "understand these things; football," "Dangerous game," I agreed, "I gave it up when I was thirty-five." "Not just joint," said the resident engineer, "it's carlidge, see? Semi-semiloolar carlidge. You're doctor. Understand." I assured him I did and moved on. Ten minutes later, with a young woman holding him up, he was steering an erratic course round the dance floor, semiloolar or no semiloolar. In a dual sense he was out on his feet.

* * *

My disability is cold feet—not the moral kind but the physical. My feet used to get so cold on most winter evenings that it often took half an hour or more to get to sleep. I tried and rejected: (1) a hot-water bottle, which warms only the soles of one's feet; (2) bedsocks, which are a bit better but make the feet unbearably hot later in the night; (3) violent exercise shortly before bedtime, which is only partly effective and a nuisance to oneself and others; (4) warming the feet before a fire, which also deals only with one's soles and is of little use unless prolonged for about 20 minutes; and (5) soaking the feet in hot water, which is effective but laborious and time-consuming. A further objection to the last three methods is that they are difficult to practise away from home.

The only treatment I have found at once simple and effective is as follows: (*a*) on arrival home in the evening, change into a dry pair of thick woollen socks. (*b*) Bedroom slippers need not be worn, but sit all evening with the feet on a cushion or hassock. (*c*) Last thing before getting into bed, wrap a big woollen scarf tightly once round one foot and then round and round both feet together, and tuck in the end. Within 2 minutes the feet are perfectly warm and one should be fast asleep. If (*a*) and (*b*) are impracticable I can get to sleep in 5 minutes on (*c*) alone, however cold my feet, and they do not get too hot later, because the scarf slips off during the night.

Warning: Be careful not to leave the scarf in bed when away from home; it may be difficult to explain to your hostess why you declined a hot bottle.

* * *

At this time of year I have to decide which of the notes and entries in my 1950 pocket-diary deserve transplanting to the 1951 presentation model. Addresses and telephone numbers are usually copied in year after year, but this time I shall use pencil for my Registrar friends and for my young sister who is training at a London teaching hospital and requires the Society column of the *Times* to record her frequent transitions from the London nurses' home to the country branch and vice versa.

It is always amazing, on thumbing over the leaves, to come across entries which I have no recollection of making. Some at once recall a theatre date or a dinner with Smith, but others are more obscure. That name and address I came across in the July pages needed several minutes' concentrated thought before it revived the memory of the charming Americans I met in the Tyrol, promised to write to, and have till this moment shamefully forgotten. Others are still more baffling—a complicated list of groceries eventually reveals itself as a recipe for Christmas pudding copied down for my mother from a patient's dictation, and "Phone Rodgers" on Sept. 10 must have had some urgency at the time though now I can remember no Rodgers in my life. I hope I remembered to phone him, anyhow.

One year I found an old entry of "Constance White," and the effort to recall this mystery woman cost me many sleepless hours before a friend, showing me round his garden in the summer, asked casually if I had bought a rosebush of that name—he had seen me take the name down in my diary the year before.

* * *

Opening the Christmas mail is not without its professional hazards. It was bad enough this year to open a 2½*d.*-stamped envelope and find it contained only a circular disguised as a Christmas card from Messrs. Drug and Bottle, but my sister, a laywoman, who was helping me sort the mail uttered a shrill yelp when she opened one envelope and, instead of robins and holly, found a realistic coloured illustration of a gastric ulcer in the early stages of healing. "This is rather a nice one, don't you think?" I asked nonchalantly, a few minutes later, putting between her still-tremulous fingers a cheery folder emblazoned with the motto "In cases of hæmorrhoids . . ." and illustrated, again in colour, with a fine proctoscopic view. "They must think you're a psycho-analyst, dear," was her retort.

* * *

In a Northern European capital, British anæsthesia was demonstrating its best to an assorted group drawn from every quarter of the Continent. One drug after another had been injected into the vein, cunningly found in a difficult arm; the endotracheal tube had been slipped into place with a facility that made the onlookers goggle; and the tubes and etceteras all fixed in place. The patient lay corpse-like and ready, and silence reigned except for the creaking of the breathing-bag being nonchalantly squeezed. The opening into the peritoneum appeared like a yawning crater, at the bottom of which could dimly be discerned some coils of gut. Suddenly there was a clatter as the Professor threw down his instruments. He glared at the top end. "I cannot work like this. There is too much relaxation," he said, "too much relaxation."

Letters to the Editor

CORONARY DISEASE AND MODERN STRESS

SIR,—Recovering from an acute respiratory infection has given me more leisure than usual to peruse your issue of Dec. 23, and with it Dr. Stewart's article. This I much enjoyed, though more as an English essay than as a scientific paper. I suppose one can enjoy an essay and still question some of the premises and disagree with some of the conclusions of the essayist.

Dr. Stewart starts with a few dogmatic statements which are surely very controversial, and goes on to a cautious and fairly critical examination of the evidence as to whether "modern stress" *has* caused an increase in coronary disease, and finds that much of this evidence is inconclusive or conflicting. He does, however, seem convinced that "the better educated and those who work with their brains are more liable than their fellows to coronary disease." The only statistical evidence for this which Dr. Stewart cites (and it is surely a question of statistics) is: (1) Dublin et al.,[1] that the mortality ratio of heart-disease amongst doctors is 1·18 of the general male population of parallel age—not a very striking figure compared with influenza, for instance (*vide infra*)—and (2) the Registrar-General's Decennial Supplement for 1931 (the last to be published) which shows that if the death-rate from coronary disease in the general male population is 100, it is for:

Agricultural workers	32
Coalminers below ground	40
Banking and insurance officials	183
Anglican clergy	218
Physicians and surgeons	368

Now I am very fond of the R-G's Decennial Supplement and happen to have it in bed with me; but its accuracy depends, as I have pointed out before[2] upon the accuracy of the material from which it is compiled—namely, death certificates. The majority of persons do not die in modern well-equipped hospitals, do not have post-mortem examinations, and are not seen by consulting physicians or cardiologists. The death certificates from which these figures were compiled were from the years 1930–32. Levine's classical article on coronary thrombosis was published in 1929, and although the condition had been recognised before, and the association between coronary-artery disease and angina pectoris had long been known, it is fair to say that coronary thrombosis as a cause of death was not commonly diagnosed even by experienced physicians until about 1930, amazing though it may seem. The majority of such deaths would be certified as myocarditis and myocardial degeneration. Diagram 3 (p. 30) of the Decennial Supplement shows clearly that while "angina pectoris" increases as we go up the social scale, myocardial disease does exactly the opposite; and the table on p. 162 shows that the figures for "myocardial disease" are for banking officials, &c., 59, and for anglican clergy 57; whereas for cotton strippers and grinders (social class IV—surely not educated brain-workers) the figure is 213. Doctors show an excess in both categories.

As the R-G (or one of his henchmen) points out on p. 60:

"degenerative disease in the heart affects all classes of males to much the same extent, but whereas amongst men whose social conditions are most favourable it tends to express itself as angina pectoris or coronary disease, at the other end of the scale it tends to take forms described on death certificates as myocarditis or myocardial or cardiovascular degeneration."

This is surely a most important statement, without which most of the figures quoted by Dr. Stewart are very nearly meaningless. (He probably had not the benefit of a respiratory infection when compiling his paper.)

I venture to suggest that the likelihood of persons dying in 1930–32 having seen a consulting physician or cardiologist might well be in the following order:

Physicians and surgeons
Anglican clergy
Banking and insurance officials
Coalminers below ground
Agricultural workers

and that the chief difference is not one of disease but of nomenclature. Perhaps the 1950–52 figures will show an equally nice social distinction between "coronary thrombosis" and "myocardial infarction."

Despite this there is still a slight preponderance of deaths due to heart-disease in males of social class I, and probably a considerable preponderance in doctors. I am not trying to make out that it does not exist—merely that a great deal of it is illusory.

Incidentally, if my present illness should require entry on a death certificate I feel sure that it will be described (probably erroneously) as "influenza," and I am sorry to note (Decennial Supplement, p. 256) that the standardised mortality ratio for doctors of my age-group is 133 (or 1·33 in the terminology of Dublin et al.); but the fact that the highest rate for influenza is amongst "makers of non-metalliferous mine and quarry products" restores some of my hopes for the New Year. As a bedside author I can recommend the R-G very highly.

Department of Medicine,
The University, Manchester. ROBERT PLATT.

1. Dublin, L. I., Spiegelman, M., Leland, R. G. *Post-grad. med. J.* 1947, **2**, 188.
2. *Brit. med. J.* 1947, ii, 77.

USE OF BACTERIA TO CONTROL VIRUS DISEASES

SIR,—Two articles on bacteriophage in no. 14 of *Science News*, by the late Prof. F. W. Twort, F.R.S., and by the late Prof. Felix d'Herelle, gave me what seems to be a novel idea for controlling virus diseases. So little success has so far been achieved in this field that practical bacteriologists and pathologists might think the idea worth pursuing.

Profesor Twort writes (p. 14):

"In test-tube experiments it is easy to arrange conditions so that a bacteriophage will kill off its host, the bacterium, but . . . it is equally easy to arrange another set of conditions in which the bacterium will kill or inhibit its invading bacteriophage."

Since there seems to be good evidence that some bacteriophages cure certain bacterial diseases, and that bacteriophages are viruses, one naturally asks whether the opposite process can occur: Can virus diseases be controlled by suitable bacteria? Dialectically this seems to demand the answer Yes. If some viruses exist at the expense of bacteria, it is surely probable that some bacteria normally exist at the expense of viruses.

Where can one find such bacteria? Dr. d'Herelle (p. 47) points out that the bacteriophage that deals with dysentery and other intestinal infections may be found in the stools of convalescent patients. This suggests that the search for suitable bacteria to counter a virus disease should begin in patients convalescent from that disease or perhaps in contacts who did not develop the disease. d'Herelle is convinced that, in some bacterial infections, the patient's spontaneous recovery invariably coincides with the appearance of bacteriophage in the patient and is in fact attributable to the presence and activity of the bacteriophage. This raises the question whether recovery from virus infections is not dependent, in some cases at least, on the appearance of specific bacteria which attack the virus. This may be the function of some of the benign bacteria harboured by the normal healthy body.

The view that freedom from certain virus infections depends on specific bacteria could explain the seasonal variations in incidence. If the virulence of bacteria towards viruses varies with temperature the resulting changes in the balance of power may account for the prevalence of colds in winter and of poliomyelitis in summer. It may also explain why a cold gets better and yet leaves no lasting immunity against subsequent attacks—as soon as we lose our protective flora we become susceptible again.

It is unlikely that all virus diseases could be treated by administering suitable bacterial cultures, but there seems to be a prima-facie case for supposing that some of them might.

Brooklyn Crystallographic Laboratory, Cambridge. NORA WOOSTER.

RUTIN

SIR,—In view of the doubts shed on the efficacy of rutin by Clark and MacKay,[1] whose work you mentioned in your leading article of Dec. 2, the following experimental results are submitted. They were obtained some months ago, before the question of the absorption of rutin had been raised.

The effect of 200 mg. of rutin (Allen & Hanburys Ltd.) taken by mouth was investigated for possible modification of cutaneous histamine weals.

Sixteen healthy young men, all in the third decade and eating what appeared to be a good mixed diet, were given the drug in tablet form at least two hours after a meal. Before taking the tablets and at hourly intervals after taking them, weals were raised on the flexor aspect of the forearms, by the intradermal injection of 0·05 ml. of a solution of 1 mg. of histamine acid phosphate in 10 ml. of normal saline. The weals were measured six minutes after the histamine injection, by transfering their outlines indirectly to millimetre-ruled graph-paper and direct computation of the resultant areas in sq. mm. At each stage, with very few exceptions, weals were raised in pairs, one on each arm, and the result entered as the mean of the two readings. With five subjects, selected merely by their willingness to undergo further tests, the series of readings was repeated, and the results entered as the mean of all readings obtained at each hourly interval. The results are shown in table I.

TABLE I—MODIFICATION OF STANDARD HISTAMINE WEALS BY 200 MG. OF RUTIN ORALLY

—	Hours after rutin						
	0	1	2	3	4	5	6
Mean area of weals (sq. mm.)	104	93	89	85	102	110	112
Number of subjects tested	16	9	10	12	11	9	7
Standard deviation of mean	11·38	15·46	12·81	12·69	17·12	14·91	9·04
Difference of mean from mean at zero hrs	..	11	15	19	2	6	8
Standard error of difference of means	..	5·89	4·95	4·64	5·89	5·73	4·45

It appears that the modification of the weals both at two and at three hours after the ingestion of the rutin is "significant." A further experiment was therefore conducted in which a pair of standard weals were raised.

200 mg. of rutin was taken by mouth, and two further weals raised after an interval of three hours. These were compared with weals raised similarly on a different occasion in the same subject, three hours after a pair of standard weals but without the administration of rutin. Ten subjects were used, drawn from the original sixteen, and the results are shown in table II. The results at the end of three hours are expressed as a percentage of the baseline reading at the commencement of the experiment.

1. Clark, W. G., MacKay, E. M. *J. Amer. med. Ass.* 1950, **143**, 1411.

TABLE II—WEAL AREA AS A PERCENTAGE OF BASELINE AREA: (A) THREE HOURS AFTER TAKING RUTIN 200 MG.; AND (B) WITHOUT RUTIN

—	Rutin	No rutin
Mean	83	103
Standard deviation	7·72	9·52
Difference of means	20	
Standard error of difference of means	3·88	

It is seen that again the modification is "significant."

Unfortunately it was not possible to conduct these experiments with the experimenter oblivious of whether he was dealing with a test or control series, so unconscious bias is not eliminated.

A further experiment was carried out in which nine of the subjects were given 60 mg. of rutin three times a day by mouth for four days.

Four weals were raised at intervals throughout the day preceding the commencement of rutin, and the process repeated on the day following the cessation of rutin treatment. The mean areas of the thirty-six weals raised before, and of those raised after, the four days of rutin treatment were 104 and 106 sq. mm. respectively.

It seemed therefore that a single oral dose of 200 mg. of rutin was capable of causing a short-lived modification of the behaviour of the skin (probably by influencing capillary permeability). The technique used detected no modification of wealing after four days of rutin given orally in the usual dosage. If, as now seems probable, only a small fraction of the single oral dose was absorbed, and if that small fraction is capable of modifying histamine weals to a detectable extent, rutin may be a potent drug when administered parenterally.

Kelvedon, Essex. P. S. BROWN.

TROPHIC AND TROPIC

SIR,—I wonder whether Professor Burn's defence (Dec. 9) of "thyrotrophic" did not oversimplify and assume knowledge not yet possessed, as much as did Professor Dible's plea (Dec. 2) for "thyrotropic." There is still an alternative—thyroid-stimulating hormone (T.S.H.). Though clumsy this at least implies no more than we know.

Rawson and Money [1] have reviewed evidence which suggests to them that the primary action of the T.S.H. is to release the thyroid hormone from the gland, through activating some enzyme system. They suggest that the other familiar effects—the increase in thyroid cell mass and activity—may all be but secondary consequences thereof. For example, T.S.H. when injected into chicks produced a significant loss of thyroid iodine by the 6th hour, while only after the 24th hour was any cellular hypertrophy or increased ability to take up iodine discernible; a maximal discharge of thyroid iodine had already occurred by the 24th hour. Again, they quote that rats whose thyroids have been severely irradiated some weeks previously, may, when T.S.H. is injected, release their thyroid iodine but show no other evidence of a thyroid response to the T.S.H. Do these experiments suggest that the primary action of T.S.H. is "nutritive" as Professor Burn would have it; does it not sound rather like "turning" the direction of the secretion?

Surely, until more is known of the mode of action of T.S.H. neither "trophic" nor "tropic" is defensible; perhaps an inconsistent usage may help us to remember this gap in our knowledge. One worker [2] finds that he

1. Recent Progress in Hormone Research. New York, 1949; vol. IV, p. 408.
2. Salter, W. T., in The Hormones. Edited by G. Pincus and K. V. Thimann. New York, 1950; vol. II, p. 208.

can use both terms—omitting the "h" when discussing the thyropituitary axis, and inserting it when discussing the anterior pituitary's influence on the growth of thyroid parenchyma. For the purists who cannot follow this practice or mouth "thyroid-stimulating hormone," there is, I fear, no satisfactory solution.

Postgraduate Medical School of London, W.12. RUSSELL FRASER.

NOTIFICATION OF FOOD-POISONING

SIR,—I should like to propose complete revision of our methods of obtaining notifications of infectious diseases. Could not notification by telephone be made statutorily permissible, and the present ruling by which a notification must be made "in writing forthwith" be regarded as the anachronistic legalism all of us now understand it to be?

The article of Dec. 23 by Dr. Brockbank and his colleagues, on an outbreak of food-poisoning due to *Salmonella aberdeen* in which not one out of 29 cases was notified, is an excellent illustration of the futility of the present system. How can a public-health department be expected to prevent outbreaks of food-poisoning if they are only to find cases so late and circuitously? The general practitioner could well give us early intimation of possible outbreaks, and would do so if his notification could be accepted by telephone rather than by filling in more certificates.

The whole system of notification is outmoded. Can you plead for us with the Ministry to take a more realistic attitude?

Ealing, London. W. G. BOOTH
Medical Officer of Health.

KWASHIORKOR

SIR,—The annotation "W.H.O., F.A.O., and Nutrition," in your issue of Nov. 18 is timely. But in addition to the two general difficulties you mention, there is a particular difficulty. Kwashiorkor is not a disease.

In the annual report of the medical department of the Gold Coast for 1932, Dr. C. D. Williams drew attention to a fatal condition in sucklings seen at the Princess Marie Louise Hospital, Accra. Both in this report and in papers she contributed to your columns the condition was fully and accurately described, as I can confirm from personal observation. It was similar to others reported from elsewhere in Africa—e.g., Gillan's œdema.

During her investigations, Dr. Williams was told that it was called *Kwashiorkor*, which meant "red boy." She assumed that the name was given to it because many of the children affected had anæmia, which changes the healthy bronze of the African skin to a dirty sienna. *Kwashiorkor*, however, does not mean "red boy" but "red *Kwashi*," *Kwashi* being the name normally given among the Akan peoples to a boy born on Sunday.

Red is the colour of evil, and "*Kwashi* the red" is a euphemism for "the very Devil." Dr. Williams thought she was treating children far gone in sickness, but what the parents were really bringing to her were the bodies of children from which the *okras* or spirits had been driven by the Devil, who now possessed and animated them. These bodies were brought in the forlorn hope that Dr. Williams, a doughty and determined fighter against evil, might drive out the Devil and recall the true spirits to their homes.

The suckling orphaned of its mother, and twins, are very liable to invasion by *Kwashiorkor*, and they are protected by substitutes, bones, carried close to or on the children, for the Devil to hop into. Another child liable to attack is one whose mother is inconsiderate enough to have intercourse before her two years of suckling that child are up. Such behaviour is considered immoral. When the mother is busy, the Devil pushes the *okra* out of the child, and the spirit goes to the new body forming in the mother's womb. When the child at her breast begins to dwine, and the signs that she is again pregnant are manifest, the mother has a fair idea of what has happened. She knows that the child is dead, but she continues to nourish its body. She has to placate the Devil, now *Kwashiorkor*, which possesses it, and she treats him as she would have treated her own child. This must continue until the devil is exorcised, or, as usually happens, goes off on his own volition. The children seen by Dr. Williams, in their mothers' opinions, had been "dead a long taime."

Possession by *Kwashiorkor* has a characteristic syndrome. Usually the time of invasion is not known, but it may be determined in cases where the mother has become pregnant. A gradual change is noted in the child's character and behaviour; it becomes moody, fretful, and listless. This is followed by a change in its appearance, caused by œdema. Characteristic skin changes herald the death of the child, who usually dies quietly in its sleep.

This is not something new out of Africa, but the syndrome of the changeling, once dreaded as much by our ancestors as it now is by the Akans.

Edinburgh. A. MACPHERSON.

PEMPHIGUS ACUTUS

SIR,—I was most interested in the case of pemphigus acutus described by Dr. Lazar on Dec. 23, but I am not convinced that the diagnosis of severe erythema multiforme of the Stevens-Johnson type can be ruled out as easily as she implies. The difficulty is that the ætiology of both conditions is unknown, and one falls back on rather vague differences in the clinical picture in an attempt to distinguish them.

Points in favour of a diagnosis of erythema multiforme in Dr. Lazar's case are the onset with involvement of the upper respiratory tract, the characteristic conjunctivitis and involvement of the eyelids, and particularly the balanitis which is most unusual in pemphigus. The presence of fœtor and the absence of erythema on the skin do not exclude a diagnosis of erythema multiforme. Finally, in deciding the diagnosis, the relative frequency of the two diseases must be taken into account. That severe erythema multiforme is relatively common is indicated by my personal experience of having seen 15 cases since 1942, 9 of which I reported in 1947[1]; and pemphigus acutus is so rare as to be almost mythical.

Reports that 'Aureomycin' is effective in the treatment of erythema multiforme have been made earlier this year by Church[2] and Lynas,[3] and I wish to report also the following case.

A retired office worker, aged 67, was admitted to the Royal Infirmary, Sheffield, on Nov. 28, 1950, with a history of a generalised macular eruption and soreness of the eyes and mouth of 4 days' duration. He had been feeling out of sorts since a fall from a step-ladder a month previously, and had taken an occasional tablet of 'Soneryl' for insomnia until a week before the rash appeared.

On admission, his temperature was 98°F, pulse-rate 112 per min., respirations 28 per min. The lips were covered with bloodstained crusts, and this made examination of the mouth difficult. However, greyish necrotic mucosa could be seen covering the inside of the cheeks, but no bullæ were visible. The palpebral conjunctivæ were covered with a glutinous exudate and the eyelids were swollen and red.

The scalp, face, trunk, and limbs were covered with an erythematous and purpuric macular eruption which was almost confluent on the trunk. Flaccid blisters were present on the top of the head, which was bald, and on the cheeks. A purulent discharge was exuding from beneath the foreskin and also from the umbilicus. No abnormality was detected on examination of the lungs, heart, abdomen, and central nervous system. The blood-pressure was 170/100 mm. Hg. A blood-count showed 4000 white cells per c.mm., with 40%

1. Sneddon, I. B. *Brit. med. J.* 1947, i, 925.
2. Church, W. E. *Lancet*, 1950, i, 281.
3. Lynas, M. A. *Ibid*, p. 378.

polymorphonuclears, 19% lymphocytes, 33% monocytes, 4% eosinophils, and 4% band cells. Blood-culture was negative; blood-urea was 44 mg. per 100 ml. The urine contained nothing abnormal. Radiography of the chest showed no abnormality. Paul-Bunnell test was negative. Culture of the conjunctival sacs was sterile.

The clinical picture and investigations were typical of severe erythema multiforme.

The patient was treated with aureomycin 250 mg. 3-hourly by mouth for 8 days, and locally with lotio acid. boric. to the eyes and genitals. Within 24 hours there was noticeable improvement in the condition of the eyes and mouth. The speedy improvement was maintained, and he was discharged home 9 days after admission, showing only slight residual desquamation of the skin.

Although the patient was not severely ill his mucous membranes and skin were extensively involved, and he recovered in 9 days. This compares with an average time of 3–4 weeks in other cases I have seen not treated with aureomycin.

Rupert Hallam Department of Dermatology, Royal Infirmary, Sheffield. I. B. SNEDDON.

PROTHROMBIN CONSUMPTION DURING MENSES

SIR,—In your issue of Sept. 30, Professor Baserga and his colleagues reported that in normal women with normal menses prothrombin consumption was constantly reduced during, and especially at the start of, the menstrual period. In the course of a report [1] on the prothrombinopenic effect of penicillin, we recorded an increase in the prothrombin level during the premenstrual phase. A systematic study of this problem has been planned.

Beilinson Hospital, Israel. Z. LEWITUS.

SALICYLATES IN ACUTE OSTEOMYELITIS

SIR,—The letter from Dr. Kelemen and his colleagues (Sept. 30) prompts us to mention some results we have reported.[2]

Starting from the accepted principle that sodium salicylate inhibits hyaluronidase exclusively in vivo, one of us thought that such antidiffusive action might be promoted by liberation or production, under salicylate treatment, of anti-hyaluronidase substances.[3] The dramatic improvement in rheumatic diseases with 'Cortisone' and adrenocorticotropic hormone (A.C.T.H.), and the recognised remarkable antidiffusive activity of such hormones, caused us to investigate possible variations in the secretion of adrenal cortical hormones in patients under treatment with salicylates.

We found that in guineapigs sodium salicylate in a daily dose of 0·075 g. caused an increase of urinary output of 17-ketosteroids per day, the increase being maximal on the 3rd and 4th days and gradually decreasing, with rather high levels on the 10th day. After stopping the drug on the 20th day, the levels remained slightly raised. With double dosage of sodium salicylate the effect was almost the same.

Daily intramuscular administration of sodium gentisate in comparable doses evoked a slower and smaller increase in urinary output than that caused by sodium salicylate. With both drugs we have observed a small but significant decrease in peripheral eosinophils and lymphocytes.

These findings suggest the existence of a relation between salicylates and adrenal function. These results should be considered together with those recently obtained by Shuman and Finestone,[4] who observed in man an increase of antidiffusive action during salicylate therapy; this they suggested was secondary to overactivity of the adrenal gland under adrenaline stress.

F. BERTOLANI
R. LORENZINI
B. BONATI.
Institute of Pathology, University of Modena.

1. *Harefuah*, July 15, 1948.
2. Bonati, B., Bertolani, F., Lorenzini, R. Atti LI Congresso Soc. ital. Med. interna, 1950.
3. Bertolani, F., Bergamini, A. *Rass. Fisiopat. clin. Terap.* 1950, **22**, 6.
4. Shuman, C. R., Finestone, R. J. *Proc. Soc. exp. Biol., N.Y.* 1950, **73**, 248.

MASS RADIOGRAPHY

SIR,—The facts given in Dr. Hoffstaedt's article of Dec. 9 will be familiar to most workers in mass radiography, who will agree that, with limited resources, high-yield or "dangerous" groups should receive priority, with special emphasis on patients referred by general practitioners. Many units have been following this policy since their inception.

I should like to examine some of the statements in your leading article of the same date, which I think may cause misunderstanding. The article says that "mass radiography, as used at present, is expensive." This sentence is preceded by a statement that

> "the tuberculosis service needs much costly renovation; it lacks new quarters and equipment for the dispensaries and chest clinics, more beds, more staff,"

and is followed by:

> "some feel that we should not be spending so much on finding new cases when we are not yet providing adequate treatment for those already found."

Presumably, it is to be understood that the money could be spent to greater advantage in another way. It is not clear whether this refers to the £109 spent finding the very early case in routine surveys, or to the £11 spent on the (somewhat more advanced) case referred by the general practitioner. Although we now know the cost of finding an early active case of pulmonary tuberculosis by mass radiography, no deductions can be made as to whether this represents good value for money. Such deductions cannot be made until we know what effect is likely to come from spending the money on any of the proposed alternatives of "new quarters and equipment for the chest clinics, more beds, and more staff." It seems unlikely that the expenditure of large sums of money on new clinic buildings would save the lives of many patients.

Large-film radiographic apparatus is often wastefully used in clinics. Two types of cases referred at present commonly receive the same investigation, without discrimination. These are: (1) the ill, or clinically difficult, case, where a consultant's opinion is required; and (2) the not-ill case, with minor respiratory or other symptoms, which the general practitioner sends for radiography to exclude pulmonary tuberculosis. It is on the first group that the consultant's skill and the expensive full routine investigation, including large films, sputum examination, blood-sedimentation rate, and blood-counts, should be concentrated. For this routine to be applied indiscriminately to the second group, where all the doctor needs is a report on a 35 mm. film, is a waste of public money. This ritual not only wastes money but also costs lives; for general practitioners well know that they must hesitate before referring "suspects" for radiography, because the symptoms "indicating" the need for these investigations are so common that, if they did, the chest clinics would be swamped with demands they could not meet. By giving general practitioners access to mass-radiographic reports, consultants would be freed to give proper attention to the management of their tuberculous cases and the investigation of clinical problems.

On this service it costs £50 to find a case of active pulmonary tuberculosis. Is this expensive? If we have, by early diagnosis, shortened the stay in a sanatorium, at £8 per week, by only six weeks, the service has paid for itself. Such cases can be prevented from becoming infectious, or can be sooner rendered non-infectious; and the patients can be restored to their jobs instead of becoming deteriorating invalids. Often they can be treated effectively at home without recourse to heroic therapy in expensive institutional beds. Early cases can be treated in sanatoria with more patients per nurse than is possible with the later cases needing long rest in bed.

In this country 20,000 people die every year from pulmonary tuberculosis; most have advanced disease when the diagnosis is made. All money spent on attempts to save these people has been wasted. If each takes one year to die in hospital, then 20,000 in hospital for one year at £300 a year each = £6,000,000. (This is the cost of running 1000 units, or twenty times the cost of the present mass-radiography service.)

What good are new quarters for the reception of those already doomed by late diagnosis? What good are more beds for the dying, with more staff to attend their exitus? Money spent on early diagnosis is money well spent.

Mass X-ray Service, Grove Hospital, London, S.W.17. F. A. NASH.

REGISTRARS

SIR,—In view of the new regulations regarding registrars, may I suggest that, out of fairness to applicants, every advertisement for a registrar appointment should clearly set out certain extracts of the conditions and terms of service.

These extracts should explain that a registrar will be liable to dismissal after his first year of appointment, and that in any case his appointment will terminate after his second year. He will be entitled to apply for a senior registrar post if he is permitted to proceed to this stage.

It should be stated that if his application is successful and he obtains the position of senior registrar, he may be entitled to serve in this capacity for three years, or in certain circumstances four years, and that his appointment as a senior registrar will then be terminated.

I feel, from personal experience of registrars, that future applicants may not be aware of the full nature of their contracts. Attention should be drawn to the recurrent reviews and possibility of dismissal, and the ultimate termination of appointment.

Friern Hospital, London, N.11. F. STEEL.

EFFECTS OF CORTISONE ON EARLY FIBROSIS OF THE LIVER IN RATS

SIR,—Dr. Aterman's article of Nov. 11 prompts us to record our results in similar experiments.

Thirty male rats were treated in a glass-topped chamber for 4 minutes daily with carbon tetrachloride inhalations. One group of rats was used as controls and another group was injected subcutaneously with 'Cortisone' (Ciba) 1 mg. daily. The animals were killed 20 and 45 days after the start of the experiment.

Post-mortem examination of cortisone-treated rats showed thymolymphatic and adrenal atrophy; the splenic and hepatic hypertrophy, following the treatment with carbon tetrachloride, was less severe in the rats treated with cortisone than in controls.

Histological examination of the liver in the controls showed severe fatty degeneration as well as marked perilobular and intralobular reticulosis and fibrosis, with consequent structural alteration of the lobules. The growing reticular and collagenous tissue was found to be rich in acid mucopolysaccharides (Hotchkiss method) and alkaline phosphatase (Gomori method). Numerous mitotic, and sometimes atypical, figures were present in the hepatic cells; cells with giant nuclei were assembled in regeneration islets.

The fatty degeneration in the livers of the cortisone-treated animals was practically of the same extent as in controls. Glycogen was definitely increased. A moderate increase of reticulum was observed in the portal spaces, but collagen tissue was absent or very scanty. The fundamental structure of the hepatic lobule was mostly preserved; the new connective tissue was very poor in acid mucopolysaccharides, and practically no alkaline phosphatase was present. The hepatic cells showed very few mitotic figures; they were not assembled in regeneration islets, nor did they contain giant nuclei.

We may conclude that cortisone definitely modifies the evolution of carbon tetrachloride cirrhosis. Fatty degeneration is not affected, but fibrosis, reticulosis, and parenchymal regeneration are greatly inhibited; such an effect is probably produced through a primary action on mesenchymal tissue and inhibition of cellular proliferation.

C. CAVALLERO
G. SALA
Anatomo-Pathological Institute, University of Milan; and A. AMIRA
Farmitalia Research Laboratories, Milan. M. BORASI.

ADJUVANTS TO STREPTOMYCIN

SIR,—The thorough and ingenious experimental studies upon which Dr. Cathie and Dr. MacFarlane based their use of streptokinase in the treatment of tuberculous meningitis gave good grounds for hope that this substance would be of value in the treatment of the disease, and their report (Dec. 16) on a series of cases treated with it is of great interest.

It is disappointing to note that when their cases are taken as a whole, including the relatively unsuccessful preliminary cases (as with the other quoted series in their table), the proportion of survivors is only 47% although two-thirds of their patients were treated with streptokinase. This is not very different from the results of others, and compares with 46% survivors in the group treated without streptokinase and reported by Dr. Russell and myself.[1] The cases that we reported are described by Cathie and MacFarlane as "selected." We would point out that the reason they were not successive admissions to the hospital was that in an undergraduate teaching hospital it is possible to set aside only a limited number of beds for this disease, and many children admitted with tuberculous meningitis had to be sent elsewhere for treatment. The selection was not made on clinical grounds but on the availability of a bed when each new case was admitted.

The results obtained by Cathie and MacFarlane suggest that streptokinase may have some effect in reducing the incidence of serious sequelæ in patients who recover from tuberculous meningitis; but their evidence so far does not seem to indicate that it is capable significantly of increasing the proportion of survivors.

Royal Hospital for Sick Children, Glasgow. PATRICK MACARTHUR.

SIR,—Dr. Cathie and Dr. MacFarlane have very ably described the methods of treating cases of tuberculous meningitis developing hydrocephalus and spinal block. We agree that ventricular drainage and administration by this route is necessary in the presence of raised intracranial pressure and hydrocephalus.

Changes in the flow of cerebrospinal fluid (C.S.F.) and even complete block may, however, be due to obstruction in the spinal canal rather than at the base of the brain. Dr. Cathie and Dr. MacFarlane described such a case (no. 37), which was admitted with a block in the dorsal region. Surely it should be unnecessary to tap the ventricles in these cases if cisternal puncture is satisfactory?

At present we have a patient, very similar to their case no. 37, in which there was complete block of the spinal canal.

In this case tuberculous meningitis had been very satisfactorily treated with streptomycin given by repeated cisternal punctures. The patient was given 100 mg. of streptomycin in 5 ml. of normal saline by cisternal puncture on alternate days for over three months. Each injection was immediately followed by some vomiting, but there were no other reactions. This child previously had burr-holes made in his skull. The ventricles were not dilated and were tapped with difficulty; each ventricular tap was followed by temporary but marked mental disturbance; and the taps were therefore abandoned after one week. We now consider that ventricular puncture was unnecessary and probably harmful in this case.

1. Russell, S. J. M., MacArthur, P. *Lancet*, 1950, i, 59.

We should therefore like to suggest that cisternal punctures should be tried before tapping the ventricles in cases where the flow of C.S.F. from lumbar puncture is unsatisfactory. This applies particularly to cases not showing signs of raised intracranial pressure.

City General Hospital, Stoke-on-Trent.

D. C. THURSBY-PELHAM
A. MCQUEEN ROBERTSON.

STUDY OF DELINQUENCY

SIR,—I had not expected that my mild remonstrance (Dec. 2), now described as a violent onslaught, would have made any dent in Dr. Stott's stereotype of the psychiatrist as an old-fashioned, incompetent, and pompous father-figure. But in face of the implied shortcomings of psychiatric practice described in Dr. Stott's paper to the psychologists (Nov. 25), I wanted to record my disagreement with his assertions.

"Cet animal est méchant—lorsqu'on l'attaque il se défend." Surely this is a simple enough explanation of the "psychiatric onslaught" without the elaborate rationalisations of projected guilt-feelings, scapegoating, Uncle Paul Reiwald, and all. One wonders whether Dr. Stott has even heard of child psychiatrists, or of the fellowship scheme of training in child psychiatry organised by the former Child Guidance Council and later by the National Association for Mental Health. It would be difficult to imagine a more realistic training than that provided by the scheme, which incorporates the new techniques demanded by Dr. Stott.

Dr. Stott omits from his list of social practitioners the school medical officer; it has been my experience, during 12 years of work in child-guidance clinics, that the school medical officer is on his toes to "spot" the maladjusted child and is quick to refer him, and to demand priority for him, at the child-guidance clinic. As for psychiatric reports to the courts, Dr. Stott must know quite well that, whatever the provocation, publication of these confidential reports would be impossible.

His position to assess the validity of psychiatric judgments is perhaps not so unique; even I, as a psychiatrist responsible for treatment of delinquent boys in an approved school, have shared to some extent the facilities he has enjoyed of reading many psychiatric reports from a number of different sources. And, Sir, I cannot confirm his general conclusions about the uselessness of these reports. Taken as a whole, the reports have been extremely useful, fair assessments of the situation and sober forecasts of the boy's future; of course there have been the occasional exceptions, but I do not base my generalisations on the odd example.

Bristol. FRANK BODMAN.

SIR,—It is good of Dr. Stott to admit (Dec. 16, p. 821) that the present revolution in clinical psychology was medically inspired. I wonder what the academic psychologists were doing at the time. Perhaps he should learn from this that the art of clinical medicine gives its votaries something more than technical knowledge, anatomical, psychological, or otherwise.

A little psychology can be a dangerous thing. I do not know that the crude mistakes made by bad psychiatrists are any worse than those made by bad psychologists. We psychiatrists can be our own severest critics; let Dr. Stott leave them to us to speak to, and let him put his own house in order.

I would accuse Dr. Stott in his propagandist zeal of grossly over-simplifying the problem of delinquency. His remedy is far too easy. From my experience let me repeat a word of advice. Modern personality psychology may be perfectly straightforward in a study or an armchair, but its practical application is a very different matter and needs something more than mere knowledge. For example, his simple panacea of fitting people into a "belonging-group" is very nice on paper, but let him try to put it into practice and he will find, as others have found, that it is not as easy as would appear. In fact it is *because* they cannot feel secure and cannot find a satisfactory belonging-group that so many cases need our help. (I emphasise satisfactory, for some of the delinquent groups may make its members feel more secure but can hardly be tolerated by society.)

Religious bodies have taught even more profound idealisms for many centuries, but have to admit that teaching, or preaching, alone is inadequate. It is that something more which one gets from clinical experience with patients, and which is the great asset of a proper medical qualification. One would hope that before long those who wish to be clinical psychologists will have to undergo something analogous in their training; this would make one more confident in handing over cases to their care.

There is plenty of room for medical and non-medical personnel in this field; and I am sure it would be happier if each of us could work for a better training of both, each within his own branch of the profession.

Leeds. H. EDELSTON.

ENDURANCE FEAT BY A YOGI PRIEST

SIR,—Dr. Vakil has given a most interesting account (Dec. 23) of the endurance of a Yogi priest sealed up in a 216 c. ft. concrete chamber. Physiological considerations, however, do not explain away the mystery as easily as he supposes.

It is not to be expected that a man sealed up in this way could use all the oxygen originally present. Assuming a resting basal oxygen usage of 0·5 c. ft. an hour, or 0·236 litres a minute (a reasonable value for a normal man) and a respiratory quotient of 0·8, at the end of 56 hours in a gas-tight cubicle of 216 c. ft. capacity, the atmosphere would contain only 7·8% of oxygen and 10·4% of carbon dioxide. In this calculation no allowance has been made for the temperature, pressure, or water-vapour content of the gas in the chamber, because the data are not available; but probable values for these quantities would lead to the expectation of 6·6% of oxygen and 11·4% of carbon dioxide. It would be a very extraordinary thing if a human being could be shown to survive for many hours in an atmosphere slowly approaching this composition. Of course the Yogi priest may have had a lower metabolic rate than the 1700 calories per day which these figures assume, and there may have been a certain amount of gaseous diffusion through the walls of the chamber, or adsorption of carbon dioxide by the walls.

When it comes to pouring water into the cubicle, there seems to be a discrepancy in the figures, for 1400 gallons will not go into 216 c. ft., and it is hardly credible that even a Yogi priest has a negative volume. I suppose a good deal of the water soaked into the concrete walls.

It is greatly to be hoped that Dr. Vakil's article will stimulate others to investigate and report similar cases. It would be very valuable indeed if an analysis could be made of the atmosphere in the chamber just before the release of the subject. Until such figures are available we cannot be sure whether there is a real or only an apparent mystery.

Department of Physiology, The Queen's University of Belfast. A. D. M. GREENFIELD.

SIR,—I have read with considerable interest Dr. Vakil's account, but its value as a scientific report is diminished by the inclusion of one or two inconsistencies, notably:

1. The total air capacity of the cubicle "worked out at 216 c. ft." Such a volume would hold 1346 gallons of water, whereas about 1400 gallons of water was introduced.

2. Despite the apparent overfilling of the cubicle the priest is reported to have been "in a state of almost complete

immersion," Apparently the cubicle was only partly full of water.

The main interest of the report seems to centre on the amount of air-space unfilled by the water, and it would be of some interest if this apparent discrepancy could be cleared up.

Harrogate. R. W. MONCRIEFF.

PULMONARY HYPERTENSION IN MITRAL STENOSIS

SIR,—In their paper of Dec. 30, Dr. Bayliss and his colleagues confirm the finding of Hickam and Cargill [1] that in subjects with mitral stenosis the pulmonary arterial pressure may rise with exercise without any increase in cardiac output. They accept the argument of the American workers that such rises cannot be attributed to the resistance offered by the mitral valve.

This argument overlooks the fact that since blood flows through the valve only during diastole the effects of heart-rate must be considered. For example, case 15 had a resting rate of 58 per minute, and an exercise rate of 145. At rest the total diastolic time per minute would be about 36 seconds; during exercise it could scarcely have exceeded 12 seconds. Approximately the same quantity of blood was passed through the valve in both these periods, and a higher pressure would be required to effect this in the shorter time.

The stenosed mitral valve causes turbulence, as evidenced by the diastolic murmur, and is unlikely to act as a linear resistance. One would in fact expect the pressure-drop across the valve to be proportional to the square of the flow rather than to the flow itself. Thus in the case quoted the pressure across the valve during diastole might have increased some ninefold with exercise in spite of an unchanged cardiac output. It is clear that it cannot be assumed that the left auricular pressure remained unchanged.

I do not wish to deny that changes in pulmonary arteriolar tone may occur under the conditions of the experiments, but merely to point out that they cannot safely be inferred from the data.

St. Thomas's Hospital, London, S.E.1. A. C. DORNHORST.

ALARMING NAMES FOR HOSPITALS

SIR,—Your annotation last week on the need for a humane psychological approach to hospital names with regard to their repercussions, so often tragic, on the patients and their families and friends, recalls a similar personal experience in relation to the old "tuberculosis dispensaries."

I had observed that the term was associated with great opprobrium by the ordinary patient, whose dread of "consumption" frequently necessitated infinite tactful explanation by the general practitioner, to persuade him to avail himself of the facilities provided by the dispensary. In 1929 the local authority with which I have been associated fell in with my suggestion to replace this unfortunate designation by that of "chest clinic," and they have now the satisfaction of knowing that their pioneer change of title has been adopted throughout the tuberculosis service of the National Health Service by all regional boards.

I have outlined in my book on Chest Disease in General Practice and, more recently, in a paper on the Tuberculosis Service in the National Health Service [2] the machinery that exists and the wider objects visualised in relation to chest disease in general and to pulmonary tuberculosis in particular. These embrace prevention, diagnosis, treatment, research, and undergraduate and postgraduate teaching.

The radical change so far as the tuberculous dispensary is concerned is now accepted, and the patient has been given peace of mind. Undoubtedly the tuberculosis (chest) service leaves much to be desired, but its potentialities for the future are unlimited.

On analogous lines, a more humane approach to the designation of hospitals with such alarming names as cancer and incurable should be possible. Such a change need involve little inconvenience or financial difficulty and would no doubt contribute to greater coördination in the hospital service as a whole.

London, W.1. PHILIP ELLMAN.

SIR,—From a long-term viewpoint there is much to be said for explaining to the public the meaning of words like cancer and consumption. But it will take very many years before the meanings are understood as we doctors understand them. It is a matter of urgent simple thoughtfulness that alarming names should be abolished. "The Brompton" has given an excellent example by dropping the reference to consumption from its notice-board. It would be much easier for general practitioners to persuade patients needing special treatment to avail themselves of the special facilities without dangerous delay if the names were no longer alarming.

It is to be hoped that the medical and lay members of the committees of hospitals with unfortunate inheritances in their names will read your annotation.

Guy's Hospital, London, S.E.1. RONALD MAC KEITH.

HEPATITIS

SIR,—Your leading article of Dec. 30, and a paper by Ballard F. Smith,[1] of Buffalo, prompt me to address you.

Dr. Smith describes his experiences when dealing with cases of infective hepatitis among service personnel at Fort Clayton Hospital. In July, 1949, he noticed a high incidence in men who had been tattooed during the period usually accepted as the limit of incubation for homologous-serum or syringe-borne hepatitis—40 to 160 days.

While serving on the staff of a large military hospital in Germany during the summer of 1947, it was pointed out to me, while visiting one of the hepatitis wards, that amongst the patients admitted during the previous ten days no fewer than 6 had been tattooed on the same day, and by the same artist, rather less than four months before. Captain W. T. Hendry, who had made the observation, was encouraged to follow it up, with the result that within a short space of time over 40 cases had been collected, all of which might well have been infected in this way. As in Dr. Smith's cases, the disease differed in no way from other cases of infective hepatitis being treated in the hospital. In all cases syphilis and syringe episodes of all kinds were excluded.

Captain Hendry visited the artist who had in every case been responsible for the decorations, and was fully satisfied that the technique used was such as to make easily possible the transfer from man to man of virus-infected blood. I had considerable difficulty in restraining my colleague, who was anxious to submit his own epidermis to the artist's needle in his attempt to establish the relation between tattooing and hepatitis!

A more complete investigation was planned, but difficulties arising from the constant release of patients at the end of their term of military service made this almost impossible. A number of recently tattooed men were, however, asked to write to Dr. Hendry in the event of jaundice appearing, and they were provided with special cards for this purpose. I am not aware, however, whether there were any results from this.

Our experience in 1947 would seem to support the opinion of Dr. Ballard Smith—that in tattooing we have yet another way in which the infection of hepatitis can be, and I believe often has been, spread.

Southampton. KENNETH M. ROBERTSON.

1. Hickam, J. B., Cargill, W. H. *J. clin. Invest.* 1948, **27**, 10.
2. *Post-grad. med. J.* 1945, **21**, 331.

1. Smith, B. F. *J. Amer. med. Ass.* 1950, **144**, 1074.

Public Health

SALARIES IN THE PUBLIC-HEALTH SERVICE

BORN after a long gestation, not free from complications, Whitley Council Medical Committee "C" last spring began the reconsideration of public-health medical salaries. Some four months of negotiation brought out the differences, on matters of principle, between the staff side, ably represented by the British Medical Association, and the management (local-authority) side of the council. These differences proving irreconcilable, the dispute was referred to the Industrial Court, at whose hearings during four days in October both sides were represented by counsel. The award of the court, which affects the salaries of 2000 local-authority medical officers, has now been published and was briefly noticed on p. 918 of our last issue.

The awards made operate from Oct. 1, 1950. They replace the agreed scales formulated in 1929 by the committee presided over by Lord Askwith. These awards had in the interval been modified, first by the inclusion of a war bonus of £60 in the lower salary ranges, and then in 1946 by the addition of 30%, 20%, and 10% to salaries whose minimum commencing points on the Askwith scale were respectively under £700, over £700, and over £1000. The final agreed revision took place in 1947, when the percentage additions to the basic Askwith minimum were increased respectively to 35%, 30%, and 25%.

For assistant and senior medical officers the court has made the following awards, against which we show the claims of the staff side and the offer of the management side:

	Staff side claim	*Management side offer*	*Industrial Court award*
Assistant medical officer	£960 × 50–1680	Grade I: £750 × 50–950 Grade II: £900 × 50–1100	£850 × 50–1150
Senior medical * officer	Minimum (depending on population) £1680 × 120–2160 Maximum £2040 × 120–2520	Grade I: £1150 × 50–1350 Grade II: £1300 × 50–1500 Grade III: £1450 × 50–1650	£1250 × 50–1650

* To be appointed only in areas where the population exceeds 250,000.

The awards for medical officers of health are set out in the accompanying table.

The court has not fixed salary scales for deputy medical officers of health, divisional or area medical officers, or officers holding mixed appointments. These are left for joint negotiation between the parties, with a right of reference, failing agreement, to the Industrial Court.

Part-time medical officers of health are to be paid in accordance with the Spens formula in respect of consultants. Holders of combined appointments are to receive £100 per annum above the appropriate salary scale for the total population of the combined districts. The method of assimilation to the new salary scale is laid down and will be readily accepted as fair. A "no detriment" clause and sick-pay scales are included, and discretion is given to count service with one authority on transferring in the same grade to that of another, in fixing the appropriate commencing salary. The undertaking of teaching duties and the disposal of any fees therefore are within the discretion of the local authority.

Under the Askwith agreement salaries could be exceeded in particular cases at the discretion of the employing authority. In the case of assistant medical officers this was done by several authorities, notably (for different reasons) Lancashire and London. The only dictum of the new award on this point is as follows:

> "In addition, if a local authority in the exercise of the discretion permitted under the Askwith agreements appointed a particular officer at a salary in excess of the minimum then current, the local authority shall in assimilating that officer to the scale now awarded fix his starting point at a similar amount above the new minimum, so however that the maximum of the new scale shall not be exceeded in such cases except at the discretion of the local authority."

These words are important. They offer a clear method of avoiding hardship to existing officers and allow progressive authorities and those in whose areas (as in London) the cost of living is high to continue their lead or to offer partial compensation for local circumstances. What is not at present evident is whether this differential advantage may be applied to new appointments, but it is to be hoped that in this matter the authorities concerned will, with the agreement of Committee "C," maintain their enlightened policy.

On the whole, the awards represent tangible salary gains to the public-health service. When compared with what the management side felt able to offer, they fully justify what was in effect an appeal to arbitration. The medical officer of health may reasonably feel that his work is now to be remunerated on a basis which does represent his specialist qualifications and training and which does bear some relation to that of his clinical peer, the consultant. On the other hand, the local authorities may also feel some satisfaction that (as the table shows) the maximum salaries of their chief officers are still closely related and that the team-work so essential in local government will not, therefore, suffer from personal rivalries. The varying scales of salary for populations of the same area will also help local authorities both to take account of local circumstances (as for instance in a county borough and an urban district) and to reward individual merit. This principle is a new one in its application to public-health salaries but there seems little reason to fear that local authorities will exploit it by always offering the lowest of the possible ranges.

SALARIES OF MEDICAL OFFICERS OF HEALTH

Population not exceeding	Claim by staff side	Population not exceeding	* Offer of management side		Award of Industrial Court	
			Minimum of salary scale between	Increments	Minimum of salary scale between	Increments
50,000	1800 × 120 to 2280					
		75,000	1250 and 1650	4 of 50	1450 and 1650	4 of 50
100,000	1920 × 120 to 2400	100,000	1350 and 1850	5 of 50	1550 and 1850	5 of 50
		150,000	1550 and 2050	5 of 50	1750 and 2050	5 of 50
200,000	2160 × 120 to 2640					
		250,000	1750 and 2250	2 of 100 1 of 50	1950 and 2250	2 of 100 1 of 50
300,000	2400 × 120 to 2880					
		400,000	2000 and 2500	2 of 100 1 of 50	2200 and 2500	2 of 100 1 of 50
500,000	2640 × 120 to 3120					
		600,000	2100 and 2700	3 of 100	2300 and 2700	3 of 100
750,000	2880 × 120 to 3360	} 600,000 +	At discretion		At discretion	
750,000 +	3120 × 120 to 3600					

* This offer is the same as the scales agreed by the Joint Negotiating Committee for chief officers of local authorities. It applies to accountants and treasurers, engineers and surveyors, chief education officers, and architects in charge of separate departments.

Misgiving centres chiefly on the salary of the assistant medical officer of health. When taxation levels and the cost of living are taken into account, a maximum salary of £1150 in 1950 does not compare very favourably with a maximum of £700 in 1929. Two other points of comparison are also available now which were not available then—namely, salaries in the hospital service and earnings in general practice. The assistant medical officer will undoubtedly look with some envy, as will the senior medical officer in charge of a school medical or maternity and child-welfare department, at the current financial status of his late colleague the chest physician. He will also await with interest the promulgation of the salary scales for his colleague the public-health dentist, now under the consideration of another Whitley committee.

Despite these doubts, the British Medical Association and the Society of Medical Officers of Health are to be congratulated on the skill and pertinacity with which they pursued their claim. The public-health service, if it has not gained all that was hoped, has nevertheless gained much by their efforts.

Smallpox at Brighton

Up to 6 P.M. on Jan. 1 there had been 11 cases of smallpox in Sussex, with 1 death. Of these, 10 were Brighton residents and 1 belonged to the neighbouring urban district of Portslade. Surviving cases are now at Long Reach Isolation Hospital, Dartford, where 4 were admitted on Dec. 29, 2 on Dec. 30, 3 on Dec. 31, and 1 on Jan. 1.

The infection appears to have been brought into the country by an R.A.F. officer, who reached Leuchars, Fife, by Service plane from Karachi, on Nov. 27. On Nov. 29 he travelled by train to Brighton and felt ill during the journey. He went to bed on reaching his destination and later a sparse rash developed, which did not come under medical observation. The minor nature of the complaint in this case is explained by the patient's high vaccination state; diagnosis in such a case is particularly difficult.

This initial case passed on infection directly to a young woman and to a man, aged 53, in the house where the officer was residing in Brighton; the man died of hæmorrhagic smallpox on Dec. 29. Indirectly, a woman and a man at Portslade were infected. Unfortunately, the condition of the first woman patient, admitted to the Bevendean Infectious Disease Hospital, Brighton, on Dec. 18, was misdiagnosed until Dec. 28. This delay allowed the dissemination of infection in the hospital, and 3 nurses there have now fallen victims. Of these nurses, 2 had never been vaccinated, and the outlook in these cases is grave; the 3rd nurse was vaccinated only once, when a child. The hospital has been in quarantine since Dec. 31.

The staff of a Brighton laundry is also involved; the officer's clothes were sent there on Dec. 13. So far there have been 3 cases from this source; 2 are women who dealt with the clothing at a receiving branch, and the 3rd is a sorter at the main laundry.

It is difficult to forecast the likely extent of this outbreak because:

1. The initial case was so modified that the patient was able to travel to and from Scotland in an infectious state.

2. The second case remained in an ordinary infectious-diseases hospital for 10 days during which no special precautions were taken. The poor vaccination state of some members of the staff there aggravates the risk. In this connection attention is drawn to the memorandum R.H.B.(50)75 issued on Aug. 17, 1950.

3. Infection in a laundry opens the way to further spread.

To minimise these risks all possible action is being taken to trace and vaccinate all known contacts both in England and Wales and in Scotland. Nevertheless special vigilance must be maintained throughout the country to detect the disease in casual contacts who have not come under surveillance. Although there are possibilities of spread, so far secondary cases have occurred only in the direct line of contact. No cases have been reported outside the Brighton area.

Influenza

There has been a marked prevalence of influenza in Scandinavia, where a virus has been isolated that is not unlike the A prime strain which occurred in this country in 1949. The disease, which has been mild but with a high attack-rate, appeared first in Sweden and then in Denmark and Norway. A high incidence of influenza has also been reported within recent weeks from certain parts of the U.S.A., Northern Spain, Sardinia, Persia, and elsewhere.

In the absence of notification of influenza, the incidence of pneumonia cases and of deaths from pneumonia and influenza are used as a guide to the prevalence of the disease. The following figures relate to the great towns of England and Wales:

	Pneumonia (including primary and influenzal)		
Week ended Dec.	*Cases*	*Deaths*	*Influenza deaths*
9	347	236	34
16	274	283	33
23	363	350	54

In England and Wales notifications of pneumonia numbered 573 in the week ended Dec. 9, 684 in the week ended Dec. 16, and 647 in the week ended Dec. 23.

These statistics afford no evidence of any serious influenza epidemic; but in the last week or more this disease has been very prevalent in the North-East, where a number of large towns have been hit, including Sunderland, Durham, and Newcastle upon Tyne. It seems likely that the disease has been introduced to this area from Scandinavia; and it may well be that laboratory studies, when completed, will show the virus strain to be identical with that in Scandinavia. The disease in the North-East seems quite distinct from the so-called influenza which is at present widespread in other parts of the country. The infection may spread southwards in the next few weeks.

Poliomyelitis

In England and Wales notifications of poliomyelitis in the week ending Dec. 23 were: paralytic 38 (82), non-paralytic 15 (25); total 53 (107). The figures in parentheses are those for the previous week, compared with which there has been a decrease of 54 cases. Uncorrected notifications for the corresponding week in 1947 and 1949 were 60 and 81.

Total uncorrected notifications for 1950 up to and including the week under review are 8643. The corresponding figures for 1947, 1948, and 1949 were 9147, 2356, and 6791.

Food-poisoning in Kendal

An outbreak of 124 notified cases of food-poisoning occurred in Kendal and south Westmorland during the three days before Christmas.

The outbreak was due to staphylococcal infection of jellied brisket and jellied veal prepared on the premises of one pork-butcher in Kendal. About 150 lb. of these meats was sold, mostly in ¼ lb. and ½ lb. orders, to several hundred customers. The meats had been prepared on Dec. 18 and 19, and sale was stopped on Dec. 23.

Clinically the features were: onset 2–4 hours after ingestion, sharp abdominal pain, severe diarrhœa, and in most cases vomiting. Usually there was no fever. Although there was some initial collapse in elderly patients, recovery was complete within 24 hours. 3 patients developed urticarial rashes, including a breast-fed baby whose mother had eaten the meat. 1 asthmatic patient developed œdema of the feet and ankles.

The first cases were notified on Dec. 22, 85 patients and staff of the Westmorland Sanatorium, at Meathop, having fallen ill after an evening meal the previous day; in this institution about 55% of those at risk developed symptoms. On Saturday, Dec. 23, notifications were received of wider spread to Kendal and the surrounding areas of south Westmorland, Windermere, and north Lancashire. All patients had eaten jellied meats from the same shop in Kendal.

An appeal for prompt notification of cases was broadcast by the B.B.C. in the 1 P.M. news on Saturday,

and there was an immediate response. The suspected food still unsold was surrendered by the manufacturer, and a warning not to eat jellied meat purchased from this shop since Dec. 20 was broadcast by the B.B.C. in the northern news on Saturday evening at 6.15 P.M. and repeated at 6.20 P.M.

The prompt publicity by the press and the B.B.C. was undoubtedly the major factor in preventing the wider spread of the food-poisoning; for it was found that many people were keeping the meat for use over Christmas. The Sunday newspapers repeated the warnings, and no onset later than Christmas Eve was reported. It is expected that further cases with an earlier onset will be reported, and it is likely that a large number of cases will remain unnotified.

Staphylococcus aureus was cultured from samples of the jellied meats, sold and unsold, from the jelly stock prepared at a stage in manufacture before it is added to the brisket and veal, and from a skin lesion on the hand of a food-handler involved. No presumptive connection can be made between this handler and the infected meat until the results of typing the organism are received from the Central Reference Laboratory. All other samples of food and drink from patients were negative for food-poisoning organisms. The gelatin powder used for thickening the meat stock was likewise negative. Circumstantial evidence pointed to an accidental infection of the jelly stock during the handling of preparation of the pressed brisket and veal; and the slow-cooling technique practised in manufacture favoured active growth of the organisms, particularly in the centre of each mould. It is not yet possible to assess the relative responsibility of toxin and living organisms in the production of the gastro-intestinal irritation, but it was felt that the toxin was the most likely factor.

Routine cleansing and disinfection of the premises was carried out, and all utensils were steam-sterilised. Lectures on food-handling hygiene were given, and three film-strips of the Central Council for Health Education were exhibited, to the management and staff of the manufacturing firm; and several modifications in the technique of manufacture were advised. A check of manufacturing methods of prepared meats in other similar premises in the area is in progress, to minimise the risk of such infections being repeated.

Obituary

PHILIP NOEL PANTON

K.T., M.A., M.B. CAMB.

ON Dec. 27 Sir Philip Panton died at his home at Bourne End after a short illness; his retirement had lasted little more than a year. Many will have heard this news with real sorrow, for, besides his colleagues and numerous generations of students at the London Hospital, he was held in high esteem and affection by hospital pathologists up and down the country, whose working conditions and status he had done so much to improve.

Philip Noel Panton, son of the late James Panton, was born 73 years ago at Wareham in Dorset. He was educated at Harrow and Trinity College, Cambridge, taking the natural sciences tripos in 1899. At St. Thomas's Hospital, where he was contemporary with H. R. Dean and A. E. Boycott, he was grounded in pathology by Shattock and Dudgeon, and the inspiration given him by these two great teachers was largely responsible for his decision to specialise in this branch of medicine.

[*Walter Stoneman*

Qualifying in 1903, he held house-appointments at Addenbrooke's Hospital, Cambridge, and then returned to St. Thomas's to work with Dudgeon as a Louis Jenner research scholar. Later with the Gilson research scholarship of the Society of Apothecaries he continued his specialist training, and when he was appointed assistant director of clinical laboratories at St. Thomas's Hospital, his election to specialise in what, for want of a better term, is known as clinical pathology was made. He held this post for only a short time, for in 1908 he went to the London Hospital as director of the clinical laboratory, a newly made post which he was to hold with distinction until 1946.

This new department, started largely at the instigation of the late Mr. Frank Kidd, began in a modest way, with one small room and a single technician. Its exact relation to existing departments was not easily defined; but thanks to Panton's professional and statesmanlike qualities the early difficulties were overcome and it continued to develop and expand. In 1934 he became director of laboratories in the hospital, which included the laboratories of the departments of chemical pathology and of bacteriology. The creation of a division of pathology which would be a geographical whole readily available to the clinician, was one of his goals, and he lived to see its accomplishment. Another objective which he set himself was to expand the research activities of the hospital laboratories. The staff of the clinical laboratory had not the leisure to use all the material reaching them, and he realised that this could only be done by the appointment of men with research ability freed from all routine duties. Thanks to the generosity of his friend the Rev. M. S. Courtauld, this was accomplished in 1926 by the formation of two Freedom research fellowships and a Freedom research studentship.

If Panton had achieved no more than this he might have been well content; but his major work was yet to come. With the outbreak of war in 1939 the London Hospital's laboratories were closed except for a small clinical laboratory, and the staff and apparatus were sent to equip new laboratories in the two sectors placed under the hospital's ægis. Panton was largely responsible for planning this transfer, and he was instrumental in having made a complete register of qualified pathologists and laboratory technicians through the country. At the outset he directed the laboratories of a sector, but it was early realised that the Ministry of Health needed an adviser on hospital pathology and Panton was the obvious choice.

Of his work at the Ministry W. J. writes:

"More than anyone else, Panton established clinical pathology as an integral part of our hospital service. As consultant adviser to the Ministry of Health he saw to it that the upgrading of hospitals in the Emergency Service included adequate provision for laboratory work. In coöperation with the medical branches of the fighting Services and the Medical Research Council, he organised a scheme for the training of pathologists and arranged for the posting of pathologists where they were most needed. He scrutinised every laboratory plan and visited regularly every laboratory centre in the country. Needless to say he knew personally every member of the service. During the war he travelled thousands of miles on duty, often in great discomfort, for he always believed that he could accomplish much more by personal contact than by writing letters from Whitehall. He encouraged regional meetings of pathologists and arranged for representatives from the regions to meet him regularly in the ministry for the discussion of matters of common interest. At times he rebelled against the slowness of the departmental machine, but he had a great sense of humour and usually got his own way in the end. By laying the foundations of a sound laboratory service in the hospitals of this country Sir Philip Panton has provided his own permanent memorial."

From the first, Panton had the vision to see beyond an emergency service. Believing firmly that an essential to good medicine was good clinical pathology, he set himself to create an adequate service of hospital pathology throughout the country. G. S. W., who shared in this arduous task, recalls how Panton performed it:

"He travelled round continually, observed the inadequate arrangements that so often existed for providing the clinician with the laboratory help to which he was entitled, and embodied his conclusions and recommendations in a series of

forceful and pregnant minutes. Everywhere he went he stimulated interest and activity. He created, he improved, he improvised, he did everything that was possible in war-time to fill the existing gaps and to strengthen the weaker laboratories. His efforts were crowned with success, and by the time the regional hospital boards took over control, the structure he had raised was ready to be incorporated as a permanent part of the National Health Service.

"Panton's contribution, however, was more than merely adding to the existing system. He raised the whole tone of pathology, and contributed substantially to the progressive differentiation that occurred during the war years between the curative and preventive sides of his subject. Once it became clear that clinical pathology was to be organised under the new Act on a regional basis and public-health bacteriology on a national basis, he insisted that the two groups of laboratories should work side by side, complementing each other in the provision of a functionally unified pathological service. Panton was simple, direct, fearless, unselfish, unassuming, unpretentious, and absolutely loyal; he inspired affection and respect among both old and young; and he probably contributed more than anyone else to the present widespread distribution of pathological facilities that the country now enjoys."

S. C. D. also pays tribute to him as an administrator who never forgot he was dealing with people.

"In the course of building up the Emergency Medical Service in hospital pathology Panton was called upon to deal with and to some extent to shape the destinies of many men and women. He was an able organiser but his exceptional quality lay in that he never failed to remember that those whom he had to fit into his organisation were human beings, all with their own personalities and each presenting a peculiar and unique case; he was keenly interested in them all and to them always readily accessible; all who approached him were sure of a sympathetic hearing and a careful consideration of their problems."

Despite advancing years Panton never spared himself, and when in 1948 the change-over to the National Health Service took place, he was at the centre to facilitate the transition. Only when this had been done did he retire; but, as events have proved, he had pushed himself so hard that he no longer had the health to enjoy the rest which he had earned so well.

S. P. B., to whom we are indebted for much of this memoir, writes:

"The account of his achievements shows a glimpse of his make-up. He was a man of great ability and excellent intellect, yet he was not outstanding as a teacher; his lectures were interspersed with marvellous touches of humour but unfortunately these escaped all but the first few rows of his audience. He did some good original work, notably on staphylococcal toxins and hæmatological problems—enough at any rate to show that given the opportunity he would have made valuable contributions to medical knowledge. It could not be claimed, however, that he was a born investigator, though his advice on a research problem could be of the greatest value and one always felt that something really useful would emerge from a discussion with him.

"Until the war came, with his appointment as consultant to the Ministry, he was hardly known outside the London. He was not a member of any of the societies which had to do with pathology, and even towards the end, when he was at last appreciated at his full merit and he was offered honorary membership in the Association of Clinical Pathologists, he declined. Honours meant absolutely nothing to him, and the one that came his way—a knighthood in 1945 for his services to pathology—he accepted because he thought the London Hospital would wish him to.

"Prowess in athletics was not one of his achievements; yet he delighted in the countryside, enjoyed walking, and was, or had been, an enthusiastic fisherman. Above all he enjoyed his garden and he spent many a happy hour working in it, though his botanical knowledge was defective and the methods he employed were sometimes unorthodox. (On one occasion he transplanted a well-grown apple tree in full bloom, and what was the more surprising was that it survived the insult.) None the less Otter's Pool was his chief relaxation and he looked forward to tending it in his retirement and to receiving there the visits of all those pathologists for whom he had worked so hard. It is sad to think that all that is no more."

J. J. A. also writes of Panton's retirement, and tells how in the intervals of the landscape gardening he compiled reminiscences of medical life which he was looking forward to seeing appear this spring.

"When they do appear they will introduce a most delightful whimsical personality to the wider world outside the profession, and amplify and crystallise many memories for those who knew him in real life. For Panton was such a lovable man, once you got behind the barrier of his shyness and were admitted to his friendship. A tolerant twinkle in his light blue eyes betrayed the kindly observer of human weaknesses, and told of the quiet fun he got out of his frequent, and apparently heated, contests with authority. For he was an individualist like his grandfather, William Frith, the famous painter of *Derby Day*, and he fought for what he considered right whenever he came up against authority—whether as a schoolboy at Harrow, an undergraduate at Cambridge, a lecturer in London, or an adviser at the Ministry of Health during the war."

And a last tribute from **F. C. O. V.** runs:

"Panton was undoubtedly conscious of his own great gifts, in which strength of character was combined with an acute and wide understanding; but his essentially formidable personality was tempered in a most attractive way by a great sense of humour, a very real sympathy and comprehension of those with whom he worked, and with a hatred of bombast in any form. This last trait was presumably responsible for his well-known inaudibility at lectures; I remember a murmur which once reached me at lunch in hospital when a visitor was holding forth at a neighbouring table: 'I wish I could think of something worth saying as loudly as that.' Yet he was in fact a master of the spoken and written word. As a student he edited the hospital gazette at St. Thomas's, writing most of it himself, as he once told me. He was never at a loss for the right word or phrase, and during his last years he wrote stories for his grandchildren as well as his reminiscences. This artistic facility, deriving possibly from his grandfather, Frith, may have made him somewhat impatient of the details inseparable from research in the laboratory, though no-one was more fertile in suggestion and advice to others. He was at his best by the bedside in the investigation of a difficult case, and it was his understanding of the needs of the clinician that led him to devote his powers of organisation primarily to building up a routine laboratory service, first at the London and later throughout the country."

CYRIL HOCKEN TEWSLEY

C.M.G., M.A. N.Z., M.D. EDIN., F.R.C.P.E., F.R.C.S.E., F.R.A.C.P.

THOUGH Dr. Tewsley was born, received his early education, and spent most of his professional life in New Zealand, he had, during his student days in Edinburgh and his war service, made many lasting ties with this country.

The son of the late Henry Tewsley, he was born in 1878 in Dunedin. From the local high school he went to Otago College, and he took his M.A. in 1901 before beginning his medical studies at Edinburgh. He qualified in 1906 and after holding house-appointments at the North Riding Infirmary, Middlesbrough, took his F.R.C.S. and his M.D. in 1909 before returning to New Zealand. There he settled in general practice in Auckland, and in 1912 he was elected to the staff of the Auckland Hospital.

[Alex Bishop

As soon as war broke out in 1914 he joined the New Zealand Medical Corps, and he left on active service with New Zealand's main body of troops. He took part in the landing at Gallipoli, and he was later in charge of the convalescent hospital at Hornchurch, Essex. On demobilisation he settled once more in practice as a general and consulting physician in Auckland, where he was medical officer to the police force and prison, and chief of the medical staff of the St. John Ambulance Association. Last August he was promoted to be a commander of the Order of St. John in New Zealand. He was also a vice-president of the Royal Australasian College of Physicians and a past president of the Auckland

division of the British Medical Association. During the late war he served with the rank of colonel as A.D.M.S. of the northern military district in New Zealand. Latterly he became interested in the history of medicine, and he gave several pleasing addresses embodying his gleanings.

Dr. Tewsley married a daughter of the late Dr. P. A. Lindsay, of Auckland. His wife survives him with two sons and three daughters.

TIMOTHY GERARD DEMPSEY

M.B. N.U.I.

Dr. T. G. Dempsey, who died in Dublin on Nov. 25 at the age of 34, qualified at the National University of Ireland in 1941. Two years later he joined the staff of the Grove Park Hospital in London, and here he became interested in clinical research on tuberculosis. He was associated with the first clinical trials in Britain of *para*-aminosalicylic acid, on which he published jointly a paper in our columns in 1947. Later he visited the Continent, America, and India, where he lectured on his experience with P.A.S. In 1948 he joined the staff of the Mayday Hospital, Croydon, where he instituted a new régime of treatment.

L. M. K. writes: "Dempsey inspired his co-workers with fresh enthusiasm in their difficult task. His charm and sympathetic manner endeared him to his patients and colleagues. He never spared himself in his efforts for the welfare of his patients, and he constantly overtaxed his own limited physical strength on their behalf. A year ago his own health broke down, but during long months of illness he never lost heart, and his keen interest in medicine did not diminish. His characteristic humour never failed him, and his courage was an inspiration to us all."

Dr. Dempsey leaves a widow and two young children.

SIR LEONARD PARSONS

J. C. S. writes: "Leonard Parsons's life was like a race well run. Quietly, steadfastly, and modestly it went from success to success. He saw early that pædiatrics could make great contributions to the teaching and practice of medicine, that it was one of the bulwarks against excessive specialism, and he designed his career to those ends. In one of his rare but delightful moments of self confession he told me that it was on a return journey from America, where he had learned so much, that he saw how an English hospital might design its work to combine research, teaching, and practice in an atmosphere of comradeship. Those who worked with him in Birmingham will know best how quickly he made his hospital one of the most famous and happy pædiatric centres in the world. But it was obvious to all of us who knew him that the success of his designs was achieved as much through the warmth of his charity as through the eagerness of his mind. He was truly both a great physician and a beloved man. In 25 years of ripening friendship I never heard him speak ill of any man, nor any man say ill of him. In these ways he went on gathering fame, and always a little surprised that it came as it did.

"So many memories of Parsons crowd the mind that it is difficult to choose, but I shall cherish always the spontaneous kindness of his remarks to a younger man at the last meeting of the British Pædiatric Association. In that frankness of discussion which has characterised the Windermere meetings, the young man had been somewhat roughly handled, and Parsons sprang to his defence with words of praise, advice, and encouragement that enriched the day. He endured unfalteringly so that none of us could believe his age. It was therefore fitting, though tragic, that his life should end suddenly on a Sunday morning when he came home from his chapel, warmed himself at the fire, and died."

Prof. G. R. GIRDLESTONE, surgeon to the Wingfield-Morris Orthopædic Hospital, Oxford, died on Dec. 30, at the age of 69.

Dr. HERBERT FRENCH, consulting physician to Guy's Hospital and author of *Differential Diagnosis*, died on Jan. 1, at the age of 75.

Notes and News

HELP YOURSELF SERVICE

ON behalf of all the rest of us, the Ministry of Pensions look after the disabled of two world wars, and in *The Undefeated* they give a good account of their stewardship. In half an hour this film contrives unobtrusively to give a general picture of the scope of the Ministry's work while telling us the simple yet moving story of Joe Anderson. Joe is a glider pilot who loses both his legs and the power of speech when he is shot down over Arnhem, and the Ministry's doctors and welfare officers literally set him on his feet again. The Ministry wisely believe that the best way of looking after their charges is to teach them as far as possible to look after themselves, and it is typical of this policy of self-help that many of the parts in the film, including Joe Anderson, are admirably played by the disabled and the staff of the Ministry. Not the least promising of these amateur starlets is the director of the Roehampton limb-fitting service as himself. The film is at present being shown at the Leicester Square Theatre, London, W.C.2.

HOSPITAL SERVICE PLAN

THE London Association for Hospital Services has sought to bring its hospital service plan into line with present-day charges and fees. It has set up a scheme whereby the whole of the maintenance charges and professional fees, at the statutory rates, will be refunded for a contributor, or any of his dependants, treated in a fee-controlled bed in a National Health Service hospital. The existing schemes have also been adjusted so as to give larger refunds in respect of maintenance charges; and there is now cover for minor operations in a surgeon's consulting-room or the patient's own home, for consultations and investigations, and for home nursing. If a contributor incurs any expenses related to a condition for which he has treatment in a general ward, the association is prepared to make a discretionary grant. For medical cases whose stay in hospital is prolonged, the six-week limit in any one year for treatment qualifying for benefit has been removed; and benefit is now paid for conditions hitherto excluded—pulmonary tuberculosis, contagious or notifiable infectious diseases, and mental deficiency and mental diseases necessitating certification. These improvements apply equally to the special scheme for doctors. The association's offices are at Tavistock House South, London, W.C.1.

ŒSOPHAGEAL SPEECH

A FILM on Œsophageal Speech after Laryngectomy has been produced for the Department of Health for Scotland in coöperation with the ear, nose, and throat department of the Victoria Infirmary, Glasgow. The film, which runs for 10 minutes, was made with the aid of Mr. T. O. Howie, surgeon to the department, and has three purposes: (1) to reassure patients about to undergo operation; (2) to train and reable patients after operation; and (3) to demonstrate the principles underlying the operation.

BIBLIOGRAPHICAL INDEX

THE committee of the London group of the university and research section of the Library Association, believing that a good deal of bibliographical material may not be coming to the attention of those who might wish to use it, has communicated with the editor of the *Bibliographic Index*, who has replied that she would welcome particulars of all specialised bibliographies for inclusion in the index. The committee hopes that librarians and others will send details to the Editor, Bibliographic Index, the H. W. Wilson Company, 950–972, University Avenue, New York 52, N.Y.

FOOD CHARTS

Messrs. Vitamins Ltd. have produced four food charts[1] designed for use by dietitians, catering officers, domestic-science teachers, and others concerned in planning meals and in elementary teaching. The nutritive value of the separate foods is expressed as the number of hours' supply of the various vitamins and minerals which is provided for an adult person by 1 oz. of foodstuff. These figures are obtained by

1. (1) The Vitamins and Minerals of Meat and Fish. (2) The Vitamins and Minerals in Dairy Produce. (3) The Vitamins and Minerals in Vegetables and Fruits. (4) The Vitamins and Minerals in Cereal Foods. From Vitamins Ltd., Upper Mall, London W.6. 6*d*. each (8*d*. post free).

dividing assessed values for each of the foodstuffs, selected from standard tables of analysis by an estimate of the optimum daily human requirement of each vitamin and mineral. The charts in this way provide an immediate visual assessment of the value of the foods judged by human requirements. The idea is ingenious, and will appeal to all who do not take kindly to large tables of figures.

THE TROMBONIST'S A.P.

THE trombonist referred to by a Peripatetic Correspondent on Nov. 11 (p. 539) writes: "Readers may like to know that my artificial pneumothorax causes no unusual sensations when I play my trombone." The word "blowing" is a misnomer when applied to playing a brass instrument. The player merely projects a thin stream of air against his lip, which in turn vibrates the air column inside his instrument. With correct breathing the diaphragm takes the larger part of the strain and the lung is not greatly overtaxed, as was shown by my doctor's ingenious experiments. In your next issue (Nov. 18, p. 593) another correspondent suggests that the first trombonist has a more tiring part than his colleagues in the Second Symphony of Sibelius. I cannot agree with this view. It is true that he has a short solo passage of three bars before the coda, but this is in the most comfortable compass of the instrument and is of equally comfortable dynamics. The maximum effort called for in this work is undoubtedly in the solo commencing 18 bars from the end of the symphony, where all three trombones play the melody *fff* in unison. This is one of the most exhausting passages in the symphonic repertoire.

University of London

At recent examinations for the academic diploma in medical radiology the following were successful:

M. M. Craig (diagnosis); Hussain Syed Ali, R. J. Dickson, A. W. Reghers (therapy).

On Friday, Jan. 26, Prof. A. W. Downie will give a lecture at the London School of Hygiene, Keppel Street, W.C.1, on Infection and Immunity in Smallpox. On Feb. 7 and 8, at the School of Pharmacy, 17, Bloomsbury Square, W.C.1, Mr. E. Lester Smith, D.SC., will speak on the Isolation, Properties, and Functions of the Vitamins B_{12}.

On Feb. 26, at the London School of Hygiene, Dr. Engelbreth-Holm, professor of pathological anatomy in the University of Copenhagen, will lecture on Folic Acid and Growth of Tumours, especially Rous Sarcoma. All the lectures will be given at 5.30 P.M.

The title of professor of clinical pathology has, as announced last week, been conferred on Dr. Montague Maizels, reader in clinical pathology at University College Hospital medical school.

Dr. Maizels took the Conjoint qualification from Guy's Hospital in 1920 and his M.B. Lond. two years later. He acted as Anderson demonstrator in clinical chemistry and medical registrar at Guy's before he was appointed pathologist to the Westminster Hospital. During the late war he was director of the emergency blood-transfusion depot at Maidstone. He has published papers on the anion and cation content of normal and anæmic blood and on cation control in human erythrocytes.

University of Liverpool

At recent examinations the following were successful:

M.D.—J. W. L. Edwards, Elizabeth Rees.

M.Ch.Orth.—N. J. Blockey, L. Bonnin, V. K. Drennan, K. S. Fan, L. Henry, J. H. Hicks, T. McSweeney, F. Machanik, J. B. Maloney, M. R. Reddy, A. M. Sallam, H. O. Williams.

Final M.B., Ch.B.—A. B. Anderson, Dorothy F. M. Burnett, R. W. H. Clarke, F. J. Deakin, C. G. H. Hall, J. C. Hinchliffe, J. A. Howe, D. O. Hughes, P. Hughes, H. G. McDonald, Roma MacDonald, C. McNamara, Alice N. O'Brien, Marianne A. A. Phillips, J. A. Seddon, V. R. Tindall, A. Unsworth, T. D. Williams, R. G. B. Willis, D. Winter, M. C. Winter (new regulations); G. M. Barnes, Monica T. Barry, Winifred Billington, Cynthia J. Bladon, Elizabeth J. Coope, H. S. Evans, T. K. Hardy, D. H. Jones, Mary W. Malone, Eileen P. O'Mahony, C. W. R. Pyne, H. Shecter, Sheila M. Ward, Marjorie J. Williamson (old regulations).

Royal College of Surgeons of Edinburgh

At a meeting of the college held on Dec. 20, with Mr. W. Quarry Wood, the president, in the chair, the following were admitted to the fellowship:

Sheroo Darabsha Bharucha, R. A. Bremner, Leon Bryer, J. C. Campbell, Mohendra Lal Chatterjee, W. Y. Cornock, Mohamed Fathi El Giziri, T. G. Evans, R. H. Freeman, D. M. Hancock, W. T. Irvine, Gopal Krishna, Robert Lipschitz, Grant McIntosh, J. T. Marcroft, A. R. Murison, J. R. Reid, Elia Gobrial Sarofim, Aubrey Schiller, B. M. C. Sedzimir, T. V. Simpson, P. C. Steptoe, A. E. M. Stevenson, Frederick Viedge, Thiagarajah Visvanathan, C. J. Windsor.

Royal College of Physicians of London

Dr. H. J. Anderson will deliver the Goulstonian lectures on Tuesday and Thursday, Jan. 9 and 11, at 5 P.M., at the college, Pall Mall East, S.W.1. He is to speak on Tuberculosis of the Pericardium.

Faculty of Radiologists

The following candidates satisfied the board at the 1950 examination for the fellowship:

A. N. Gaballa, W. S. Holden, G. B. Locke (radiodiagnosis); D. G. Bratherton, B. A. Stoll, R. C. Tudway (radiotherapy).

British Association of Plastic Surgeons

The following officers and members of council have been elected:

President, Mr. A. B. Wallace (Edinburgh); vice-president, Mr. R. J. V. Battle (London); treasurer, Mr. R. P. Osborne (Liverpool); secretary, Mr. J. P. Reidy (London); editor, Mr. A. B. Wallace (Edinburgh); members of council, Mr. J. N. Barron (Salisbury), Mr. G. M. FitzGibbon (Bristol), Prof. T. P. Kilner (Oxford), Sir Archibald McIndoe (London), Mr. J. S. Tough (Glasgow), and Mr. Rainsford Mowlem (London) ex-officio as immediate past-president.

Association of Psychiatrists of the Scottish Western Region

The following office-bearers have been elected for 1950–51:

Chairman, Prof. T. Ferguson Rodger; vice-chairman, Dr. A. Dick; secretary, Dr. Hunter Gillies; treasurer, Dr. M. M. Whittet. Dr. Gillies may be addressed at The Crichton Royal, Dumfries.

King's College Hospital

Dr. V. F. Hall has been appointed dean of the medical school in succession to Mr. Harold Edwards. Mr. A. J. Heriot succeeds Dr. Hall as vice-dean.

Heberden Society

A clinical meeting will be held at the Westminster Hospital Medical School on Wednesday, Jan. 24, at 4 P.M. Cases will include some demonstrated a year ago, to show progress. Dr. L. E. Glynn will show, for Dr. W. S. C. Copeman and Dr. O. A. Savage, a short film on the Therapeutic Effects of 'Cortisone.'

International Hospital Congress

The International Hospital Federation is holding the seventh International Hospital Congress in Brussels from July 15 to 21, under the chairmanship of Dr. René Sand. The central theme will be the Care of the Chronic Sick and the Aged, and the speakers will include Dr. E. M. Bluestone, director of the Montefiore Hospital, New York, and Prof. Pierre Delore, of the University of Lyons. The federation may be addressed in this country at King Edward's Hospital Fund, 10, Old Jewry, London, E.C.2.

Blood Donors

In England and Wales gifts to the National Blood Transfusion Service in the quarter ended Sept. 30 numbered 133,693, bringing the total for the first nine months of the year to 388,000—a new post-war record. Over 31,000 volunteers joined the service in the September quarter. This brings the total of donors to 398,000—a gain of nearly 10,000 in the quarter. To keep ahead of the growing demand a further 190,000 donors are needed.

Houses for Doctors

Housing authorities have been asked by the Minister of Health to help in securing houses for general practitioners. In a circular the Minister expresses the hope that when a doctor's application to build his own house is supported by the executive council, the local authority will consider the issue of a licence. It would, furthermore, be helpful if in suitable cases local authorities "would be able to agree to provide a site by sale or lease. It might be appropriate for the local authority to make a site available for the purpose on their larger estates. Similarly, should a doctor apply to the local authority to rent one of their houses, the Minister trusts that the application will receive sympathetic consideration when it is supported by the Executive Council." When local authorities are considering the allocation of the tenancy of a house intended for occupation by a doctor, the executive council should be informed so that they can, if necessary, advertise the vacant practice. "It will be appreciated that the statutory functions of Executive Councils may be impaired unless there is the fullest possible co-operation between them and the local housing authorities."

Medico-Legal Society

The annual dinner of this society is being held at the Savoy Hotel, London, W.C.2, on Thursday, Jan. 11, at 7.45 P.M. Further particulars may be had from the hon. secretary, 40, Carey Street, W.C.2.

Chemotherapy of Tuberculosis

The Medical Research Council of Ireland is holding a colloquium on this subject in Dublin from July 10 to 13. The speakers will include Dr. Marc Daniels and Dr. P. D'Arcy Hart (London), Prof. G. Domagk (Wuppertal-Elberfeld), Dr. W. H. Feldman (Mayo Foundation), and Dr. Edgar Lederer (Paris). Further particulars will be found in our advertisement columns.

Compensation for Practices

Doctors in Northern Ireland who wish to claim compensation for their practices and who have not yet received a claim form should apply to the Ministry of Health and Local Government, Stormont, Belfast, or to the Northern Ireland General Health Services Board, 27, Adelaide Street, Belfast. Details of those who are eligible and further particulars will be found in our advertisement columns.

Prescription of Spectacles

Under the National Health Service (Supplementary Ophthalmic Services) Amendment (no. 2) Regulations, 1950, the Minister of Health has laid down that, from Feb. 1, where an ophthalmic practitioner or ophthalmic optician has caused an excessive cost to the service by prescribing lenses or glasses beyond those necessarily required by the patient, the Minister may, after investigation, direct that a sum be deducted from the remuneration of the practitioner or optician.

CORRIGENDUM: *Primary Streptomycin-resistant Tuberculosis.*—In fig. 4 of the paper by Dr. Tinne and Dr. Henderson (Dec. 30, p. 901) the resistant strain is above the control.

Births, Marriages, and Deaths

BIRTHS

BRANCH.—On Dec. 22, the wife of Dr. W. E. R. Branch—a daughter.
DICKINSON.—On Dec. 13, in London, to Dr. Barbara Dickinson (née Thomas), wife of Mr. J. R. Dickinson, F.R.C.S.—a son.
GAIRDNER.—On Dec. 24, the wife of Dr. Douglas Gairdner—a daughter.
GRIMBLY.—On Dec. 12, in London, to Dr. Florence Chouler, wife of Dr. Alan Grimbly—a son.
HAMILTON.—On Dec. 17, in New York, the wife of Dr. Leonard Hamilton—a daughter.
HAVELOCK.—On Dec. 20, in Liverpool, to Dr. Joyce Havelock (née Buck), wife of Mr. Brian Havelock—a son.
HAWKSLEY.—On Dec. 29, in London, the wife of Dr. J. C. Hawksley—a daughter.
IMRIE.—On Dec. 24, at Guildford, the wife of Dr. D. A. Imrie—a daughter.
JAMES.—On Dec. 28, in Birmingham, the wife of Dr. Ronald James—a son.
MACLEOD.—On Dec. 28, in London, the wife of Dr. W. M. Macleod—a son.
PRANKERD.—On Dec. 23, in London, the wife of Dr. T. A. J. Prankerd—a son.
RANDALL.—On Dec. 23, at Beckenham, Kent, the wife of Dr. Keith Randall—a daughter.
RIGDEN.—On Dec. 21, the wife of Dr. B. G. Rigden—a son.
SARGENT.—On Dec. 18, at Salisbury, the wife of Dr. David Sargent—a son.
SLADEN.—On Dec. 28, at Clacton, the wife of Dr. F. J. Sladen—a daughter.

MARRIAGES

CAMPBELL—POUND.—On Dec. 23, David George Robertson Campbell, B.M., to Peggie Pound.
WOLFF—KEENAN.—On Nov. 17, in London, Frederick W. Wolff, M.B., to Catherine Bernadette Keenan.

DEATHS

ABERCROMBIE.—On Dec. 26, Robert Heron Abercrombie, M.B. Glasg., aged 61.
COOPER.—On Dec. 21, William Francis Cooper, M.B. Camb.
COUTTS.—On Dec. 19, at St. Helier, Jersey, Duncan Coutts, M.D. Aberd., F.R.C.O.G., lieut.-colonel, I.M.S. retd, aged 68.
GIRDLESTONE.—On Dec. 30, Gathorne Robert Girdlestone, M.A., D.M. Oxfd, F.R.C.S., aged 69.
GULLY.—On Dec. 28, in London, Robert Cullum Gully, M.D. Lond.
HARRIS.—On Dec. 26, in London, Sampson George Victor Harris, M.D. Durh., D.P.H., aged 85.
HEATH.—On Dec. 23, at Barmouth, John Rippiner Heath, B.A. Camb., M.R.C.S., aged 63.
MARTIN.—On Dec. 27, at Exmouth, Claude Buist Martin, C.M.G., M.B. Edin., colonel, R.A.M.C. retd, aged 81.
MITCHELL.—On Dec. 20, Albert Waldegrave Mitchell, M.R.C.S.
PANTON.—On Dec. 27, at Bourne End, Bucks, Philip Noel Panton, Kt, M.A., M.B. Camb.
THOMAS.—On Dec. 27, at Wembley, Albert Edward Thomas, M.A., D.M. Oxfd, D.P.H., Barrister-at-Law.
WARRICK.—On Dec. 21, in London, Robert Walter Warrick, M.B. Lond.

Diary of the Week

JAN. 7 TO 13

Monday, 8th

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, S.E.5
5.30 P.M. Dr. E. Stengel: Lecture-demonstration.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Dr. Keith Simpson, Mr. Ivan Magill, D.A.: Unexpected Death Following Operation.

Tuesday, 9th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. H. J. Anderson: Tuberculosis of the Pericardium. (First Goulstonian lecture.)
INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5 P.M. Dr. J. O. Oliver: The Pyogenic Cocci in Dermatology.
CHELSEA CLINICAL SOCIETY
7 P.M. (South Kensington Hotel, 47, Queen's Gate Terrace, S.W.7.) Mr. Ebbe Munck: Danish Exploration in Northern Greenland. (Coloured cinematograph film.)

Wednesday, 10th

INSTITUTE OF DERMATOLOGY
5 P.M. Dr. C. W. McKenny: X-ray Technique.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow
5 P.M. Sir John Parkinson: Symptoms in Cardiac Diagnosis.

Thursday, 11th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. Anderson: Tuberculosis of the Pericardium. (Last Goulstonian lecture.)
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, S.W.1
4.30. P.M. Psychiatry lecture-demonstration.
ROYAL ARMY MEDICAL COLLEGE, John Islip Street, S.W.1
5 P.M. Sir Lionel Whitby: Significance of Anæmia.
INSTITUTE OF DERMATOLOGY
5 P.M. Dr. J. O. Oliver: Pathology.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
5 P.M. Air Commodore E. D. D. Dickson: Otitic Baratrauma.
LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Dr. O. F. Thomas, Dr. R. M. Todd, Dr. C. A. St. Hill: Chemotherapy in Tuberculosis.

Appointments

AINSLIE, DEREK, M.A., M.B. Camb., F.R.C.S., D.O.M.S.: asst. ophthalmic surgeon (consultant), Middlesex Hospital, London.
BATEMAN, D. V., M.B. Camb., D.A.: anæsthetist, Haymeads Hospital and Bishop's Stortford Hospital.
BENSON, R. C. S., M.B. Lond., M.R.C.P.: general physician, Rush Green Hospital, London.
BEYNON, D. W., M.B. Lond., M.R.C.P., D.C.H.: pædiatrician to clinics in areas of Bournemouth and East Dorset, West Dorset, and Salisbury group of hospitals.
CLYNICK, F. E., M.B. St. And., D.A.: anæsthetist, Bethnal Green Hospital.
DARKE, G. H., M.B. Lond., F.R.C.S.E.: senior surgical registrar, Bristol clinical area.
FISK, G. R., M.B. Lond., F.R.C.S., F.R.C.S.E.: orthopædic surgeon, St. Margaret's Hospital, Epping.
FOXEN, E. H. M., F.R.C.S., D.L.O.: ear, nose, and throat surgeon, Enfield War Memorial Hospital.
GRENVILLE, HARRY, M.R.C.S., D.A.: anæsthetist, London Jewish Hospital and St. Margaret's Hospital, Epping.
HALSTEAD, JOAN, M.B. Manc.: venereologist, Croyden General Hospital.
HERBERT, GLADYS, M.R.C.S., D.P.H.: senior asst. M.O., maternity and child welfare, Newport, Mon.
HERINGTON, GODFREY, M.B. Lond., D.A.: anæsthetist, Wanstead Hospital.
HUNTER, W. R., CH.M. Lpool, F.R.C.S.: consultant general surgeon, Walton Hospital, Liverpool.
JACKSON, H. H. W., M.B. Lond., F.R.C.S.: senior surgical registrar, South Somerset clinical area.
KENTON, BERNARD, M.R.C.S., D.C.H., D.A.: anæsthetist, Bethnal Green Hospital.
KING-TURNER, C. J., M.R.C.S.: appointed factory doctor, Fairford district, Glos.
LEWIS, W. J., M.R.C.S., D.A.: anæsthetist (S.H.M.O.), Southmead Hospital, Bristol.
MCKELVIE, I. L., M.A. Camb., M.R.C.S., D.M.R.: radiologist, Epsom District Hospital.
MURRAY, G. H., M.B. Edin., M.R.C.P.E.: consultant chest physician, North Liverpool area.
NELSON-JONES, ARCHIBALD, M.D. Lond., M.R.C.P.: general physician, Forest Hospital and Woodford Jubilee Hospital.
READ, A. M., M.B. Lond.: asst. chest physician, Portsmouth area.
ROWLES, AMELIA, M.B. Wales, D.P.H.: asst. M.O.H., Walsall.
SAINSBURY, H. S. K., M.R.C.S.: asst. M.O.H., Herefordshire.
SAVAGE, T. R., M.A., B.M. Oxfd, M.R.C.P., D.C.H.: pædiatrician, Oldchurch Hospital and Wanstead Hospital.
SETH-SMITH, D. W., M.R.C.S., D.M.R.: radiologist, Norwood and District Hospital.
STEINGOLD, LOUIS, M.B. Glasg.: pathologist, St. Andrew's Hospital, Bow.
SUTCLIFFE, MARY, M.A., M.B. Camb., D.P.H.: deputy divisional M.O. and deputy M.O.H., S.E. urban districts, Surrey.
SWINSON, A. E. P., M.B. Belf.: S.H.M.O. psychiatrist, Mendip Hospital, Wells.
WAUCHOB, D. W., M.B. Belf., D.P.H.: deputy M.O.H., Blackpool.
WICKES, I. G., M.A., M.B. Camb., M.R.C.P., D.C.H.: pædiatrician, South-East Essex group of hospitals.

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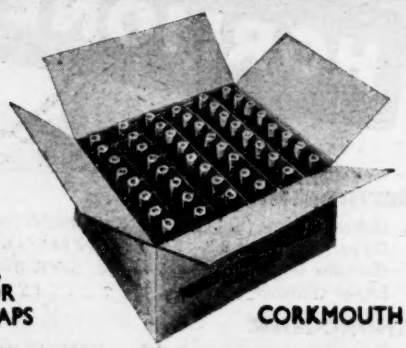

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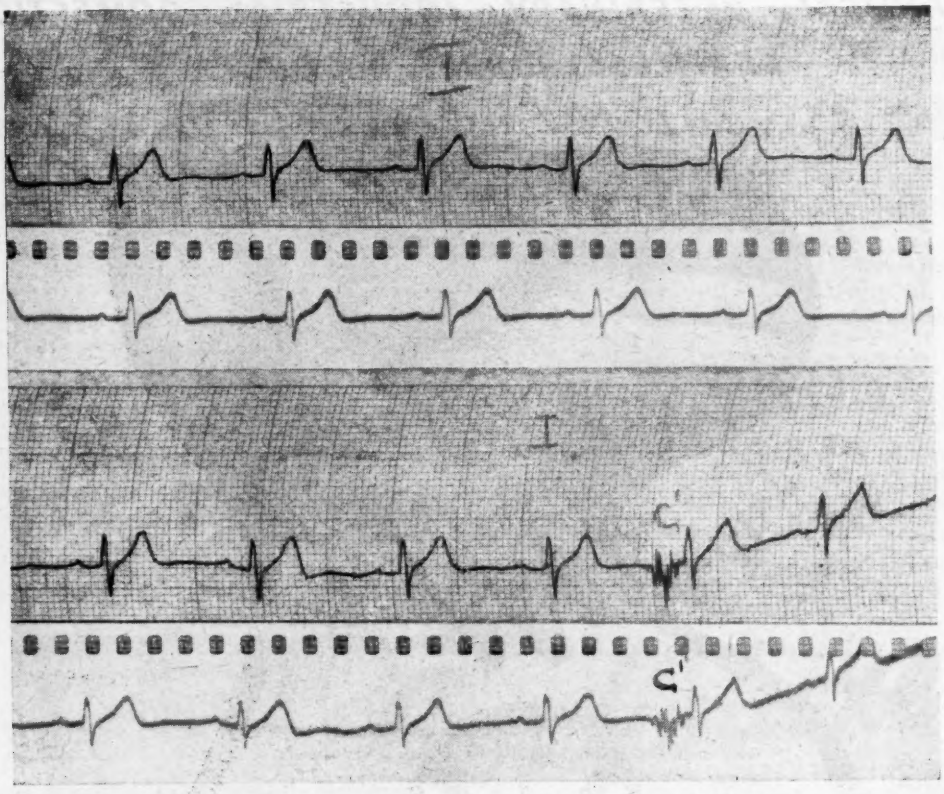

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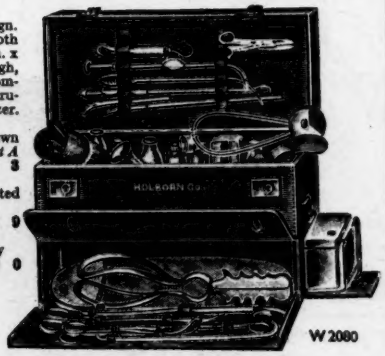

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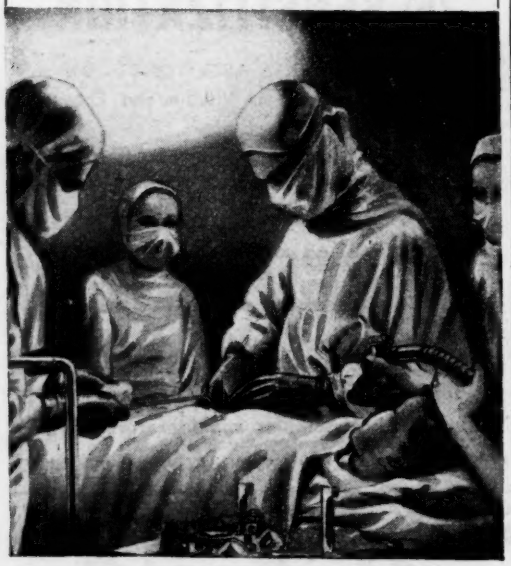

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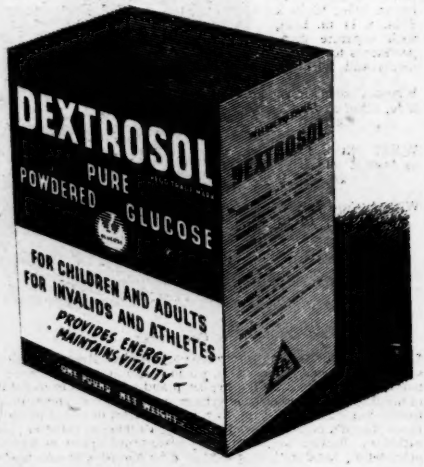

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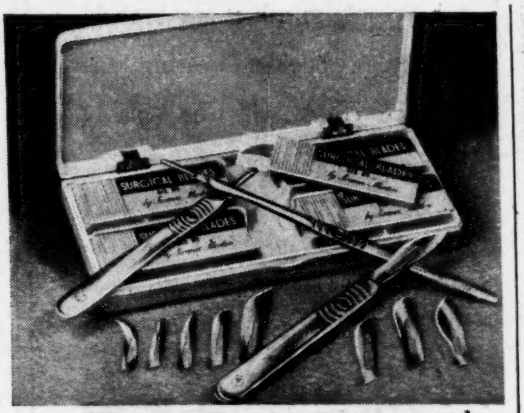

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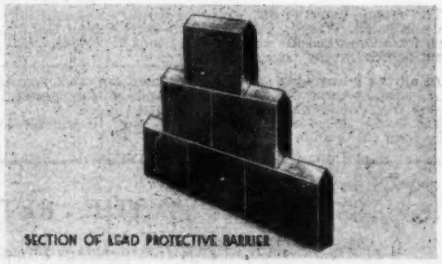
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Special provision for Invalids. Milk from own Farm. Two passenger Elevators. Electric Light. Night attendance. Rooms well ventilated and all Bedrooms warmed throughout the Establishment. Large Winter Garden. Extensive Pleasure Grounds. Matlock Golf Links, 18 holes, within easy distance. A large staff (over 40) of Male and Female Attendants, Masseurs, and Bath Attendants.

The Baths constitute a wing of the Hydro and access is by lift from all floors without stairs.

Admission may be arranged through the Consulting Physician, from whom any further information required is available.

Prospectus and full particulars on application

Telegrams: "Smedleys Matlock" *Telephone:* Matlock 17 (5 lines)

WYKE HOUSE, ISLEWORTH

MIDDLESEX (Tel. EALing 7000)

A Private Hospital for individual treatment of all forms of Nervous and Mental Illness, including Alcoholism and Drug Addiction. Uncertified and certified patients are admitted. This well-known Home for Men and Women has been reorganised, and all well-tried modern treatments are available.
Dr. H. PULLAR-STRECKER — Dr. G. W. SMITH, O.B.E.

HEIGHAM HALL, NORWICH

PRIVATE MENTAL HOME for Nervous and Mental illness. All types of treatment carried out. Accommodation for Alcoholics and Addicts available. Special Geriatric Unit now open. Fees from 6 gns. per week upwards according to requirements.
Apply to Dr. J. A. SMALL — Telephone: Norwich 20080

ST. ANDREW'S HOSPITAL FOR NERVOUS AND MENTAL DISORDERS

NORTHAMPTON

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, K.G., C.M.G., A.D.C.

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, biochemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombières treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-ray Room, an Ultraviolet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for biochemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: Northampton 4354 (3 lines)), who can be seen in London by appointment.

The Pioneer Hospital, opened 1796, for the humane treatment of those suffering from Nervous and Mental Disorder

THE RETREAT, YORK

This Independent Hospital of 260 beds, administered by a Committee of the Society of Friends, combines what is best in the investigation and treatment of nervous illness with a sympathetic and friendly atmosphere. In 1949, 373 patients were admitted, of whom no fewer than 303 were voluntary cases.

Much curative work is accomplished in our mental hospitals today and the recovery rate compares very favourably with that of our general hospitals.

For information and terms of admission apply to:—
The Physician Superintendent,
ARTHUR POOL, M.R.C.P., D.P.M.
(Telephone: York 54551)

CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

Telegrams: "PSYCHOSIS, LONDON"

A PRIVATE HOSPITAL FOR THE TREATMENT OF NERVOUS AND MENTAL DISORDERS

Telephone: RODNEY 4343 (2 lines)

Completely detached Villas for mild cases. Voluntary Patients received. Fifteen acres of grounds; own garden produce. Hard and grass tennis courts, putting greens. Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actinotherapy, prolonged immersion baths, shock and all modern forms of treatment. Chapel.

Senior Physician, Dr. C. M. T. HASTINGS, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are reasonable, may be obtained upon application to the Secretary

The Convalescent Branch is HOVE VILLA, BRIGHTON.

HAYDOCK LODGE

NEWTON-LE-WILLOWS, LANCASHIRE

For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Disorders, Alcoholism, and Drug Addiction, either voluntarily, temporarily, or under certificate. Patients are classified in separate buildings according to their mental condition. Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens, in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *Telephone:* Ashton-in-Makerfield 7311. *Telegraphic Address:* Wootton, Ashton-in-Makerfield.

RUTHIN CASTLE, NORTH WALES

A Private Clinic, the first in Great Britain, for investigation and treatment of all forms of disease, except infectious and mental

Nursing, dietetic, massage, x-ray and laboratory departments — Central heating and a lift to all floors

Inclusive charges — Apply SECRETARY — Telephone: Ruthin 66

CLIFFDEN, TEIGNMOUTH

For the early treatment of nervous disorders and patients needing rest and care

A well-appointed House with spacious balconies and extensive views of the South Devon Coast. Beautiful garden and own dairy in 35 acres
In the same grounds, **ROWDENS**, a comfortable house with lovely views. Private road to the beach
There is also a charming house, **EBWORTHY, MANATON, DARTMOOR**, situated in 25 acres, 1100 ft. up for bracing moorland air
Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—TEIGNMOUTH 289 and 537

CHEADLE ROYAL CHEADLE CHESHIRE

A Registered Hospital for MENTAL DISEASES and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales

The object of this Hospital is to provide the most efficient means for the treatment and care of patients of both sexes suffering from MENTAL and NERVOUS DISEASES. The Hospital is governed by a Committee appointed by Trustees.
VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS RECEIVED

For Terms and further information apply to the MEDICAL SUPERINTENDENT *Telephone*: GATLEY 2231

THE PSYCHONEUROSES & NEURASTHENIA

BOWDEN HOUSE
HARROW-ON-THE-HILL

Est. 1911 Tel. BYRon 1011

(Incorporated Association not carried on for profit)

Private Nursing Home in pleasant surroundings, providing a high standard of individual care and treatment of nervous disorders in Men and Women.
All patients have separate rooms and begin with a Diagnostic week, when clinical, pathological and radiological investigations are made. Modern treatments available.

ROBUTTI CLINIC

ALASSIO, ITALIAN RIVIERA

Superbly situated Private Clinic for the care and treatment of physical and psychosomatic illness (including asthma and anxiety states); also for convalescence and high-protein diet. X-rays, physical therapy, &c. English and Italian speaking physicians and nurses. Medical Superintendent: Renzo Deaglio, M.D. Matron: Miss Rosina Robutti. Consulting Physicians: Carl Lambert, M.D., and Philip Strang, M.R.C.P.
Inquiries: Secretary, 3, Upper Brook Street, W.1.

SPRINGFIELD HOUSE

Phone: BEDFORD 3417 **Near BEDFORD**

For Mental Cases with or without Certificates

Fees from Seven Guineas per week (including Separate Bedrooms for all suitable cases without extra charge)

For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.

INTERVIEWS IN LONDON BY APPOINTMENT

THE COTSWOLD SANATORIUM

On the Cotswold Hills, seven miles from Cheltenham, Stroud and Gloucester, equipped for the treatment of Pulmonary Tuberculosis.

Terms from £9 15s. 6d. per week

Full particulars from SECRETARY, COTSWOLD SANATORIUM, CRANHAM, GLOUCESTER.

Telephone: Witcombe 2181 Telegrams: "Hoffman, Birdlip"

UNIVERSITY EXAMINATION POSTAL INSTITUTION

POSTAL COACHING FOR ALL MEDICAL EXAMINATIONS
For Prospectus and list of tutors apply to Dr. G. E. OATES, University Examination Postal Institution, 17, Red Lion-square, London, W.C.1 (Phone HOLborn 6313).

Academic and Educational

ROYAL COLLEGE OF PHYSICIANS OF LONDON

Dr. HECTOR JOHN ANDERSON, F.R.C.P., will deliver the GOULSTONIAN LECTURES ON TUESDAY, 9TH JANUARY and THURSDAY, 11TH JANUARY, 1951, at 5 P.M. at the College, Pall Mall East, S.W.1.
Subject: "Tuberculosis of the Pericardium."
Any member of the medical profession admitted on presentation of card.
By order of the President.
HAROLD BOLDERO, Registrar.

THE UNIVERSITY OF MANCHESTER
FACULTY OF MEDICINE

The Faculty of Medicine, in conjunction with the St. Mary's Hospitals for Women and Children, proposes to conduct a POSTGRADUATE COURSE IN OBSTETRICS, especially intended for general practitioners. The course is to comprise 12 weekly meetings to be held on WEDNESDAYS from 10.0 A.M.–4.0 P.M. commencing on 24TH JANUARY and concluding on 11TH APRIL. The fee for the course is 7 guineas, though doctors taking part in the National Health Service may be able to claim the fee and travelling expenses from the Ministry of Health.
Applications should be made to the Dean of Postgraduate Medical Studies not later than 17th January, 1951.

REUBEN HARVEY MEMORIAL PRIZE

Notice is hereby given that the 23rd award of this Triennial Prize will be made on 1ST JULY, 1951.
The competition for the Prize is open to all students of the various Schools of Medicine in Dublin which are recognised by the Medical Licensing Bodies in Ireland, and also to graduates or licentiates of these bodies of not more than 3 years' standing at the time of the award.
The Prize will be awarded to the writer of the best Essay, on a subject to be selected by the candidate, evidencing research in animal physiology or pathology: the essay to be illustrated by drawings or preparations.
The essays, bearing fictitious signatures, are to be lodged with the Registrar of the Royal College of Physicians of Ireland, Kildare-street, Dublin, on or before 1st June, 1951.
T. PERCY C. KIRKPATRICK, M.D. Univ. Dubl., Fellow and Registrar, R.C.P.I.
NORMAN RAE, SC.D., Registrar, R.C.S.I.

UNIVERSITY COLLEGE, LONDON

FREE PUBLIC LECTURES, SPRING TERM, 1951

THURSDAYS, 18TH, 25TH JANUARY, at 5.15 P.M., Dr. F. BERGEL, "Physico-Chemical Properties and Pharmacological Activity of Drugs."
FRIDAYS, 2ND, 9TH FEBRUARY, at 5.15 P.M., Dr. T. S. WORK, "Cell Metabolism and Chemotherapeutic Activity."
Details of all public lectures from Assistant Secretary, University College London, Gower-street, W.C.1. (Stamped envelope required.)

WESTMINSTER MEDICAL SCHOOL
UNIVERSITY OF LONDON

An intensive course in preparation for the F.R.C.S. (FINAL) EXAMINATION will be held at Westminster Hospital, the Gordon Hospital, All Saints' Hospital and Westminster Children's Hospital from 5TH MARCH to 28TH APRIL, 1951.
The course will include lectures, clinical demonstrations, tutorial and surgical pathology classes, with classes in operative surgery on the cadaver. It will be limited to 20 postgraduates. Fee £52 10s.
Applications for further information and for enrolment should be addressed to the Secretary, Westminster Medical School, 17, Horseferry-road, London, S.W.1, as soon as possible.

TUBERCULOSIS EDUCATIONAL INSTITUTE

A 3-day CLINICAL COURSE will be held at the Red Cross Sanatoria of Scotland (Glen o' Dee and Tor-na-Dee) on 17TH, 18TH, and 19TH JANUARY. Fee £3 3s.
Applications for further information and enrolment should be addressed to the Secretary, Tuberculosis Educational Institute, Tavistock House North, Tavistock-square, London, W.C.1.

EDINBURGH POST-GRADUATE BOARD FOR MEDICINE

GENERAL SURGERY

A 3 months' course of Postgraduate Surgery is arranged to start on 26TH MARCH, 1951. It is suitable for surgeons requiring a refresher course in the current outlook on general surgery or for graduates preparing to specialise in surgery; approximately 275 hours of instruction are provided. A similar course will be held starting on 1st October, 1951. Fee £31 10s.

INTERNAL MEDICINE

A course lasting 12 weeks, suitable for graduates wishing a refresher course, or to specialise in medicine, begins on 2ND APRIL, 1951. These courses consist of 320 hours' instruction, comprising lectures, clinical demonstrations, and ward visits. A similar course begins on 1st October, 1951. Fee £31 10s.
Additional instruction in Clinical Pædiatrics is arranged in conjunction with the course in medicine, for which there is a small fee; the numbers are limited.

MEDICAL SCIENCES

A 3 months' course in Applied Anatomy, Physiology, Pathology, Bacteriology, and Biochemistry will begin on 2ND JULY, 1951. This course is suitable for postgraduates wishing to take the Primary Fellowship examination, as a final preparation in these subjects. Considerable basic knowledge is highly desirable prior to taking this course. Fee £31 10s.
Applications for enrolment to Director of Postgraduate Studies, Surgeons' Hall, Edinburgh, 8. Applicants for courses should supply particulars of qualifications and postgraduate experience.

MEDICAL RESEARCH COUNCIL OF IRELAND

COLLOQUIUM ON THE CHEMOTHERAPY OF TUBERCULOSIS
(Preliminary Announcement)

It is proposed to hold a Colloquium on the above subject in Dublin from 10TH–13TH (inclusive) JULY, 1951.

The lecturers will include Dr. V. C. Barry (Medical Research Council of Ireland), Dr. Marc Daniels (Medical Research Council, London), Professor G. Domagk (Wuppertal-Elberfeld), Dr. W. H. Feldman (Mayo Foundation), Dr. P. D'Arcy Hart (Medical Research Council, London), Mr. T. J. D. Lane (Meath Hospital, Dublin), and Dr. Edgar Lederer (Institut de Biologie Physico-Chimique, Paris).

Further information on the detailed arrangements may be had from J. G. BELTON, Honorary Secretary, Organising Committee, Laboratories, Medical Research Council of Ireland, Trinity College, Dublin.

UNIVERSITY OF OXFORD. Medical School. Applications are invited for the post of GRADUATE ASSISTANT in the Division of Laboratories of the Radcliffe Infirmary, Oxford. The duties will include teaching, and there are opportunities for research investigations in the various departments. The salary range is from £600–£1300.

Applications, together with the names of 3 referees, should be forwarded to Dr. A. H. T. ROBB-SMITH, Radcliffe Infirmary, Oxford, not later than 27th January, 1951.

UNIVERSITY OF LONDON. Applications are invited for I.C.I. RESEARCH FELLOWSHIPS in Biochemistry, Chemistry, Engineering, Pharmacology, Physics, or allied subjects, for which some appointments will be made during the current academic year. Fellowships will normally be tenable from 1st October, 1951, for 3 years in the first instance. The salary will depend on qualifications and experience, but will be within the range of £600–£900 p.a.

Detailed regulations and application forms can be obtained from the Academic Registrar, University of London, Senate House, W.C.1, and applications must be received at that address not later than 30th April, 1951.

UNIVERSITY OF LONDON. The Senate invite applications for the READERSHIP IN ANATOMY tenable at St. Bartholomew's Hospital Medical College. Salary £1200–£1800 p.a.

Applications (10 copies) must be received not later than 21st February, 1951, by the Academic Registrar, University of London, Senate House, W.C.1, from whom further particulars should be obtained.

UNIVERSITY OF GLASGOW. Applications are invited for I.C.I. RESEARCH FELLOWSHIPS in Biochemistry, Chemistry, Engineering, Pharmacology, or Physics, to which some appointments may be made during the current academic year. The appointments will date from 1st October, 1951 (or earlier in the case of selected candidates who may be available before that date). The salary will depend upon qualifications and experience, but will be within the range £600–£900 p.a., together with F.S.S.U. benefits and family allowances.

Applications (8 copies), with a list of publications and names of 2 referees, should be sent not later than 28th February, 1951, to the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON,
Secretary of University Court.

UNIVERSITY OF GLASGOW. Applications are invited for appointment to a SENIOR LECTURESHIP in Experimental Pharmacology. A medical qualification is not essential. Salary scale £1500–£1800 for medically qualified, £1150–£1400 for non-medically qualified. Initial salary according to experience and qualifications. F.S.S.U. and family allowance.

Applications (6 copies) should be lodged not later than 31st March, 1951, with the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON,
Secretary of University Court.

THE UNIVERSITY OF LEEDS. Department of Physiology. Applications are invited for a LECTURESHIP IN PHYSIOLOGY either on salary scale £800–£100–£1300 if medically qualified, or £550–£50–£1100 if not medically qualified.

Applications, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 31st January, 1951.

THE UNIVERSITY OF MANCHESTER. Chair of Dental Surgery. Applications are invited for the full-time Professorship of Dental Surgery. The University is prepared to consider candidates with experience and qualifications in any branch of dentistry. Salary not less than £2250 p.a., with membership of the F.S.S.U. Duties to begin on a date to be arranged.

Applications should be submitted not later than 28th February, 1951, to the Registrar, The University, Manchester, 13, from whom further particulars may be obtained.

W. MANSFIELD COOPER, Registrar.

McGILL UNIVERSITY, MONTREAL

A limited number of openings for training are available to British candidates in the Department of Psychiatry of McGill University, Montreal. Applicants must have graduated from an acceptable medical school and have had a general internship. The 4-YEAR COURSE is designed primarily to prepare individuals to enter the field of general hospital, community, or university psychiatry, or to prepare them for research work in this field. Credit may be allowed for previous training. Shorter periods of instruction may be arranged as well as instruction in special fields. Those accepted for training are assigned to one of the 6 university teaching areas in Montreal. These positions carry with them board and lodging and a small stipend.

Applicants should write to the Chairman of the Department of Psychiatry, McGill University, Montreal, Canada. Interviews with a staff member will be arranged in London. The opening date for the new session is 1st July, 1951, and applications are being currently considered.

INSTITUTE OF UROLOGY (University of London) in association with ST. PETER'S and ST. PAUL'S HOSPITALS. Applications are invited for the post of DIRECTOR of the Institute (part-time). The Director will be expected to do research, and be responsible for the development of all research work. Duties will also include supervision of the administration, teaching, and follow-up work. Salary in accordance with seniority and time given to the work.

Applications (8 copies), with 8 copies of 3 recent testimonials, to the Secretary not later than 24th January, 1951.

BRITISH EMPIRE CANCER CAMPAIGN invites applications from British subjects for EXCHANGE FELLOWSHIPS IN CANCER RESEARCH offered by the National Cancer Institute of Canada and the American Cancer Society. Fellowships are awarded for periods of 1 year and the annual stipend will be $4000. Travelling expenses to centre of work will be borne by the Campaign.

For further particulars apply to the Secretary-General, 11, Grosvenor-crescent, London, S.W.1.

SOUTH OAKS, a 229-Bed Psychiatric Hospital, environs New York City, has vacancy 2 FELLOWSHIPS IN PSYCHIATRY. $3000 per year, with full maintenance.

Apply M. S. TITLEY, M.D., Sunrise Highway, Amityville, New York.

Hospital Services : Senior Appointments

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of SURGEON to the above Hospital for 4 half-days per week. This is a general hospital of about 158 Beds. Applicants should possess a higher surgical qualification and have had wide experience in general surgery. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 20th January, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Secretary of the Hospital.

ST. MARY'S HOSPITAL, London, W.2. Applications are invited for the appointment of Part-time CONSULTANT ANÆSTHETIST to the St. Mary's group, to undertake up to a maximum of 9 notional half-days per week. The duties of this appointment include attendance at the Constituent Hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous and present appointments, together with the names and addresses of 3 referees, should reach the undersigned by 13th January, 1951. Canvassing will disqualify, but applicants are not precluded from visiting the Hospital.

12th December, 1950. ALAN POWDITCH, House Governor.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications invited for post of SENIOR HOSPITAL MEDICAL OFFICER in the Venereal Diseases Department. The successful candidate will be required to attend 3 half-days a week. Salary will be in accordance with the terms and conditions of service of medical and dental officers.

Applications (12 copies), together with the names of 2 referees, should be submitted to the Secretary by 23rd January, 1951. Canvassing of members of the Board of Governors or of the Advisory Appointments Committee will lead to disqualification.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications invited for post of SENIOR HOSPITAL MEDICAL OFFICER in the Chest Department. The successful candidate will be required to attend 2 half-days a week. Salary will be in accordance with the terms and conditions of service of medical and dental officers.

Applications (12 copies), together with the names of 2 referees, should be submitted to the Secretary by 17th January, 1951. Canvassing of members of the Board of Governors or of the Advisory Appointments Committee will disqualify.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications invited for post of SENIOR HOSPITAL MEDICAL OFFICER in the Department of Physical Medicine. The appointment will be whole-time or the maximum part-time by agreement with the successful candidate. Salary will be in accordance with the terms and conditions of service of medical and dental officers.

Applications (12 copies), together with the names of 2 referees, should be submitted to the Secretary by 23rd January, 1951. Canvassing of members of the Board of Governors or the Advisory Appointments Committee will lead to disqualification.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1. Applications are invited for the appointment of FOURTH ASSISTANT SURGEON (Consultant status), part-time. Candidates must be Fellows of the Royal College of Surgeons of England, and must have had experience of training in both general surgery and thoracic surgery. The duties of the Fourth Assistant Surgeon will consist of the practice, as well as the teaching, in both of these departments of surgery. The appointment is for 3–4 notional half-days, and the terms and conditions of service of hospital medical and dental staffs (Consultant status) will apply.

Applications (10 copies), with the names of 3 referees, should be sent to CHARLES M. POWER, House Governor and Secretary, by 6th February, 1951. Canvassing of members of the Board or Advisory Appointments Committee will lead to disqualification.

Provincial

ASHFORD HOSPITAL, Ashford, Middlesex. North West METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of ANÆSTHETIST, either whole-time or for maximum permitted number of sessions, at the above Hospital. This is a general hospital of approximately 600 Beds—mostly acute with the usual special departments. Applicants should possess a higher qualification and have wide experience in modern methods of anæsthesia. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 20th January, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Medical Director.

AMENDED ADVERTISEMENT

BATH CLINICAL AREA. South-Western Regional HOSPITAL BOARD invite applications from registered medical practitioners for the appointment of ASSISTANT ANÆSTHETIST in the Bath Clinical Area which comprises Bath, North East Somerset, Mid and West Wilts. The appointment will be on a whole-time basis and the salary and terms and conditions of service will be those laid down by the Ministry for Senior Hospital Medical Officers (£1300–£1750 p.a.). Applicants should possess high medical qualifications, and wide experience in anæsthetics is essential. The successful applicant will be required to work under the general direction of the Consulting Anæsthetiste mainly at the Royal United Hospital, Bath, and to visit other hospitals in the clinical area as may be required by the Regional Hospital Board from time to time.

Applications (12 copies), stating date of birth, qualifications, and experience, together with 12 copies of 2 testimonials, and the names and addresses of 2 referees, should be addressed to the Secretary of the South-Western Regional Hospital Board, 5, Cotham Lawn-road, Bristol, 6, so as to reach him not later than 13th January, 1951. Canvassing will disqualify, but this does not preclude applicants from visiting the hospitals concerned.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the whole-time or maximum part-time post of CONSULTANT PHYSICIAN, Bolton Hospital Centre. Salary, whole-time £1700–£2750, part-time pro rata; starting-point according to experience, &c. A higher qualification, sound general experience and training, together with special experience of diseases of the chest, including tuberculosis, essential. Clinics at Bolton Royal Infirmary, Townley's Hospital, Bolton, and the Special Chest Clinic, Bolton, with charge of beds at Townley's Hospital. The person appointed will also act as Consultant Physician to 810 tuberculosis beds in other hospitals in the Group. National terms and conditions of service applicable and post superannuable.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, together with the names and addresses of 3 referees, to be received not later than the 17th January, 1951. Canvassing will disqualify.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the whole-time post of DEPUTY DIRECTOR of the Regional Blood Transfusion Service. Salary £1300 (at age 32)–£50–£1750 p.a. Previous experience of blood-transfusion work essential and a higher qualification desirable. National terms and conditions of service applicable and post superannuable.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, together with the names and addresses of 3 referees, to be received not later than the 17th January, 1951. Canvassing will disqualify.

MANCHESTER. UNITED MANCHESTER HOSPITALS. Applications invited for posts of 2 SENIOR HOSPITAL MEDICAL OFFICERS (full-time) tenable at the Manchester Royal Eye Hospital. Salary according to scale.

Applications should be forwarded to the undersigned not later than 13th January, 1951, and should contain the names of 3 referees to whom reference may be made.

F. J. CABLE, Secretary to the Board of Governors.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following post in the South-Eastern Region of Scotland: Whole-time ASSISTANT TUBERCULOSIS PHYSICIAN (Senior Hospital Medical Officer grading) for Bangour Hospital. The Senior Tuberculosis staff at Bangour Hospital comprises 2 Consultants in addition to the post now advertised. The unit has 240 Beds at Bangour Hospital and, in addition, is responsible for the tuberculosis work in West Lothian, part of Midlothian and Peeblesshire.

Applications (14 copies), giving particulars of age, previous experience, and qualifications, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, within 30 days.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following post in the South-Eastern Region of Scotland: Whole-time ASSISTANT ORTHOPÆDIC SURGEON (Consultant grading) for East and West Fife. The person appointed will work under the general guidance of a Senior Visiting Orthopædic Surgeon, and will be expected to assist in the development of the orthopædic service in Fife as well as undertaking responsibility for operative work and visiting clinics. He will be required to reside in Fife.

Applications (14 copies), giving particulars of age, previous experience, and qualifications, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, within 30 days.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following post in the South-Eastern Region of Scotland: Part-time ASSISTANT PHYSICIAN (6 sessions), Consultant grading, for the Rheumatic Unit in the Edinburgh Northern group of hospitals. The unit consists of 45 Beds, is staffed by a Physician, an Assistant Physician (post now advertised), a Registrar, and other Junior staff, and undertakes certain research projects and the teaching of undergraduates and postgraduates. Previous experience of rheumatic diseases would be an advantage.

Applications (14 copies), giving particulars of age, previous experience, and qualifications, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, within 30 days.

SAFFRON WALDEN GENERAL HOSPITAL. (50 Beds.) EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT ANÆSTHETIST (for equivalent of 1 notional half-day weekly) at above Hospital. The salary and terms of conditions of service of hospital medical and dental staffs will apply.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, should reach the undersigned not later than 22nd January, 1951. Canvassing of Board or Committee members will disqualify. K. V. F. MORTON, Secretary.

117, Chesterton-road, Cambridge.

SHEFFIELD REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners with a higher qualification in Psychiatry for the following posts:—

(*a*) CONSULTANT PSYCHIATRIST (whole-time) who will be attached to the Pastures Hospital, Mickleover, Derbyshire. The appointment includes specialist duties in the hospital and at outpatient clinics at other hospitals. The person appointed may be designated Deputy Medical Superintendent. A house is available on the hospital estate if desired by the successful candidate.

(*b*) CONSULTANT CHILD PSYCHIATRIST. The post will be held on a whole-time or maximum part-time basis. The person appointed will be attached to the Mapperley Hospital, Nottingham, but the majority of his time will be spent at clinics in the Child Guidance Centres of the City and County of Nottingham, in coöperation with those local authorities.

The salary and conditions of service will be in accordance with those agreed between the Ministry of Health and the Profession. The posts are subject to the National Health Service (Superannuation) Regulations, 1950.

Application forms and full details may be obtained from the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Completed forms must be received not later than 20th January, 1951. Candidates applying for more than one appointment should indicate their preference. Canvassing will disqualify, but candidates are invited to visit the hospitals and clinics concerned by direct arrangement.

WELSH REGIONAL HOSPITAL BOARD invite applications for the appointment of a Whole-time CONSULTANT SURGEON to serve the Clwyd and Deeside Hospital Management Committee Area. He will be based at Rhyl. Candidates should be a Fellow of a Royal College of Surgeons. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs and will be subject to the National Health Service (Superannuation) Regulations, 1950.

Applications, stating date of birth, giving a summary of qualifications, experience, and publications, with names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify, but this does not preclude candidates from visiting hospitals in the area.

WELSH REGIONAL HOSPITAL BOARD invite applications for the appointment of a Whole-time CONSULTANT ANÆSTHETIST to serve the Clwyd and Deeside Hospital Management Committee area. He will be based at Rhyl. Candidates should be in possession of the Diploma of Anæsthetics and have had a wide experience of the subject. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs and will be subject to the National Health Service (Superannuation) Regulations, 1950.

Applications, stating date of birth, giving a summary of qualifications, experience, and publications, with names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify, but this does not preclude candidates from visiting the area concerned.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications to fill 2 vacancies for CONSULTANT ANÆSTHETISTS at the following groups of hospitals:—

(i) Bromley.

(ii) Medway and Gravesend.

Candidates must have had wide experience in anæsthetics and hold the Diploma in Anæsthetics. Choice of whole-time employment or the maximum number of part-time sessions will be offered. The appointments will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1. The last day for acceptance of applications will be 19th January, 1951, and selected candidates will be interviewed in London on 22nd February, 1951. Canvassing of members of the Board or the Advisory Appointments Committee will disqualify, but applicants may visit the hospitals concerned.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications to fill a vacancy for a CONSULTANT PATHOLOGIST at the Tunbridge Wells group of hospitals. Candidates must have had wide experience in pathology with special reference to biochemistry and a higher university degree or membership of a Royal College of Physicians is desirable. Choice of whole-time employment or the maximum number of part-time sessions will be offered. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1. The last day for acceptance of applications will be 19th January, 1951, and selected candidates will be interviewed in London on 22nd February, 1951. Canvassing of members of the Board or the Advisory Appointments Committee will disqualify, but applicants may visit the hospitals concerned.

Hospital Services : Junior Appointments

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. (General—315 Beds.) CENTRAL GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for 2 posts of HOUSE PHYSICIANS, vacant 1st February and 27th February, 1951, respectively. Appointments are for 6 months only, and the salary, depending upon the number of previous posts held, £350, £400, or £450 p.a., less a residential charge of £100 p.a.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 testimonials, should reach the Assistant Secretary by 16th January, 1951.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. BATTERSEA AND PUTNEY GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (second or third post) required for 6 months from 1st February, 1951, to include 2 months' casualty duties. Salary £400–£450 p.a., according to experience, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by the Ministry of Health.

Applications, stating age, nationality, experience, and qualifications with dates, accompanied by copies of 3 recent testimonials, should be sent before 15th January, 1951, to the Administrative Officer.

BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. HOUSE SURGEON (Neurosurgical Unit). The post is resident and tenable for 6 months. Salary £400 or £450 a year, according to experience, less £100 p.a. for residential emoluments.

Applications, together with copies of 2 recent testimonials, to be sent to Secretary, Woolwich Group Hospital Management Committee, Memorial Hospital, Woolwich, S.E.18.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. Applications are invited from registered Women medical practitioners for the post of HOUSE SURGEON to Gynæcological Department (recognised for M.R.C.O.G.). Duties to commence 1st March, 1951. Appointment for 6 months. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary by 9th January.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. Applications are invited from registered Women medical practitioners for the post of HOUSE SURGEON for Gynæcological and Special Departments. Duties to commence 1st March, 1951. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary by 9th January.

EVELINA HOSPITAL FOR SICK CHILDREN, Southwark Bridge-road, London, S.E.1. (An Associate Hospital of Guy's Hospital.) There is a vacancy for a Part-time NON-RESIDENT CASUALTY OFFICER for 5 morning sessions weekly. The appointment is for 6 months from 1st February, 1951, and for the purpose of salary is graded as Junior Registrar.

Applications, accompanied by copies of recent testimonials, should reach the undersigned not later than first post, 18th January, 1951. W. H. SIDNELL, House Governor.

HIGHLANDS HOSPITAL, Winchmore-hill, London, N.21. Required, HOUSE SURGEON (first post), vacant 20th March, 1951. 6 months' appointment. Salary £350 p.a., less £100 p.a. for residential emoluments.

Applications, with copies of 3 testimonials, to be sent to the Secretary, Northern Group Hospital Management Committee, Royal Northern Hospital, Holloway, London, N.7, from whom forms of application may be obtained.

HIGHLANDS HOSPITAL, Winchmore-hill, London, N.21. Required, HOUSE PHYSICIAN (first post), vacant 1st March, 1951. 6 months' appointment. Salary £350 p.a., less £100 p.a. for residential emoluments.

Applications, with copies of 3 testimonials, to be sent to the Secretary, Northern Group Hospital Management Committee, Royal Northern Hospital, Holloway, London, N.7, from whom forms of application may be obtained.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies for 3 Whole-time ASSISTANT MEDICAL REGISTRARS on 1st April, 1951. The appointments are graded as Registrarships within the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Further particulars and form of application, which must be returned not later than 5th February, 1951, are obtainable from H. F. RUTHERFORD, House Governor and Secretary.

HACKNEY HOSPITAL, E.9. Hospital Management COMMITTEE, HACKNEY GROUP (NO. 6). Applications invited for 6 months appointment as CASUALTY OFFICER (second or third post) to act also as House Physician to the Skin Department, post now vacant. Salary and conditions of service as approved for hospital medical and dental staffs—£400–£450 p.a., less £100 p.a. for residential amenities.

Applications, together with copies of 3 testimonials, should be sent to the Secretary, Hackney Group Hospital, Management Committee, Hackney Hospital, E.9, not later than 15th January, 1951.

HOSPITALS FOR DISEASES OF THE CHEST. Applications are invited from suitably qualified medical practitioners for the post of RESIDENT SURGICAL FIRST ASSISTANT AND REGISTRAR at the Hospital's Country Branch, Arlesey, Beds (near Letchworth). The post is graded Senior Registrar and the appointment is for 1 year and renewable. Higher surgical qualifications and experience in thoracic surgery essential.

Applications (6 copies), with copies of 3 testimonials, should be sent to the Secretary, London Chest Hospital, E.2 (from whom further particulars may be obtained), to arrive by 20th January, 1951.

LONDON CHEST HOSPITAL. Hospitals for Diseases OF THE CHEST. Applications invited from suitably qualified medical practitioners for the post of ANÆSTHETIC REGISTRAR (part-time). The grading will be that of Registrar or Senior Registrar, according to qualifications and experience. The appointment is for 1 year and renewable, and attendance is required on 7 notional half-days a week, including 3 at the Country Branch.

Applications, stating age, qualifications with dates, and previous appointments held, and accompanied by copies of 3 testimonials, should reach the undersigned not later than 20th January, 1951.

London Chest Hospital, E.2. THOMAS BROWN, Secretary.

MILE END HOSPITAL, Bancroft-road, London, E.1. (455 Beds.) Required, SENIOR HOUSE OFFICER (Casualty Department). The successful candidate may elect to be non-resident. Salary, &c., in accordance with national scale.

Application forms obtainable from the Secretary, Stepney Group Hospital Management Committee, Raine-street, Wapping, E.1.

MEMORIAL HOSPITAL, Shooters-hill, S.E.18. House SURGEON (recognised for F.R.C.S.), vacant approximately 16th February. The post is resident and tenable for 6 months. Salary £400 or £450 a year, according to experience, less £100 p.a. for residential emoluments.

Applications, together with copies of 2 recent testimonials, to be sent to Secretary, Woolwich Group Hospital Management Committee, Memorial Hospital, Woolwich, S.E.18.

NEW END HOSPITAL, London, N.W.3. Archway Group HOSPITAL MANAGEMENT COMMITTEE.

HOUSE SURGEON, post vacant 11th February, 1951.

HOUSE PHYSICIAN, post vacant 4th February, 1951.

National scale and conditions apply.

Applications, stating age, qualifications, and experience, with copies of recent testimonials, to Surgeon-Specialist Superintendent, New End Hospital, London, N.W.3, by 20th January, 1951.

PLAISTOW MATERNITY HOSPITAL, London, E.13. Applications invited from registered medical practitioners (Male or Female) for resident post of HOUSE OFFICER (obstetrics), second or third post. Salary and terms of service as laid down by the Ministry of Health. Appointment is for 6 months, commencing as soon as possible. The above post is recognised for the training of candidates for D.Obst. R.C.O.G.

Applications, together with 2 recent testimonials, should be sent not later than 13th January, 1951, to—

M. J. HUNTLEY, Secretary,
West Ham Group Hospital Management Committee.
Stratford, London, E.15.

POSTGRADUATE MEDICAL SCHOOL OF LONDON, UNIVERSITY OF LONDON. HOUSE SURGEON (orthopædics) required 1st March, 1951. R practitioners not considered.

Apply, the Dean, Postgraduate Medical School, Ducane-road, London, W.12, before 13th January, 1951.

PRINCE OF WALES'S GENERAL HOSPITAL. (231 Beds.) Required, RESIDENT CASUALTY OFFICER (third post) for a period of 6 months, commencing 5th March, 1951. Salary in accordance with the terms of service issued by the Ministry of Health.

Application form from the Secretary, Tottenham Group Hospital Management Committee (Group 4), The Green, Tottenham, N.15, to be returned to the Secretary by 12th February, 1951.

PRINCE OF WALES'S GENERAL HOSPITAL. (231 Beds.) Required, RESIDENT SENIOR HOUSE PHYSICIAN (third post), for a period of 6 months commencing 9th March, 1951. Salary in accordance with the terms of service issued by the Ministry of Health.

Application form from the Secretary, Tottenham Group Hospital Management Committee (Group 4), The Green, Tottenham, N.15, to be returned to the Secretary by 5th February, 1951.

PRINCE OF WALES'S GENERAL HOSPITAL. (231 Beds.) Required, RESIDENT JUNIOR HOUSE PHYSICIAN (first or second post), for a period of 6 months commencing 7th March, 1951. Salary in accordance with the terms of service issued by the Ministry of Health.

Application form from the Secretary, Tottenham Group Hospital Management Committee (Group 4), The Green, Tottenham, N.15, to be returned to the Secretary by 5th February, 1951.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL, Goldhawk-road, W.6. Applications are invited from registered medical practitioners for the resident appointment of JUNIOR DISTRICT OBSTETRIC OFFICER (Senior House Officer), tenable for 6 months from 1st April, 1951. Candidates must be ineligible for H.M. Forces and be in possession of a current driving licence. The holder of this post proceeds to the senior post after 3 months. The salary (£670 p.a.) is subject to a deduction at the rate of £130 p.a. for board and lodging.

Applications must be lodged with under-mentioned by 17th January, 1951, on forms to be obtained from R. S. H. THOMAS, Secretary to the Board of Governors, 339, Goldhawk-road, London, W.6.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL, Goldhawk-road, W.6. Applications are invited from registered medical practitioners for the resident appointments of JUNIOR OBSTETRIC OFFICER (Registrar), 2 vacancies, tenable for 6 months from 1st April, 1951. Candidates must be ineligible for H.M. Forces. The holders of these posts proceed to the senior posts after 3 months. The salary (£775 p.a.) is subject to a deduction at the rate of £130 p.a. for board and lodging.

Applications must be lodged with under-mentioned by 17th January, 1951, on forms to be obtained from R. S. H. THOMAS, Secretary to the Board of Governors, 339, Goldhawk-road, London, W.6.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE (GROUP 27), Hackney-road, E.2, Shadwell, E.1, and Banstead Wood, Surrey. Applications invited from suitably qualified practitioners (Male and Female) including R practitioners within 3 months of qualification for 3 appointments as HOUSE OFFICERS, vacant on 1st March, 1951. These appointments, which will be made in accordance with the terms of service issued by the Ministry of Health, will be made for 2 periods of 6 months each. First period as House Physician (including 2 weeks' leave), followed by second period as House Surgeon (including 2 weeks' leave), and Casualty Officer.

Application forms may be obtained from the undersigned and should be returned, with copies of not more than 3 testimonials, on or before 15th January, 1951.

Hackney-road, E.2. CHARLES H. BESSELL, Secretary.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. NORTHERN GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON AND CASUALTY OFFICER, post vacant 15th February, 1951, for a period of 6 months. Salary at rate of £400–£450 p.a., according to experience, with a deduction of £100 p.a. in respect of residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent not later than 20th January, 1951, to—

GILBERT G. PANTER, Secretary.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. NORTHERN GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON AND CASUALTY OFFICER, post vacant 10th February, 1951, for a period of 6 months. Salary at the rate of £400–£450 p.a., according to experience, with a deduction of £100 p.a. in respect of residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent to the undersigned not later than 13th January, 1951. GILBERT G. PANTER, Secretary.

ROYAL NORTHERN HOSPITAL, Holloway, London, N.7. NORTHERN GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN, post vacant 8th February, 1951, for a period of 6 months. Salary at rate of £400–£450 p.a., according to experience with a deduction of £100 p.a. in respect of residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent not later than 13th January, 1951, to—

GILBERT G. PANTER, Secretary.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, London, W.C.1, and Golden-square, W.1. There will be a vacancy for a post of RESIDENT HOUSE SURGEON (second or subsequent post) on 1st March, 1951. Appointment for 6 months, with salary as laid down for House Officer grades in the terms and conditions of service under the National Health Service.

Applications, stating age, qualifications, full details of previous experience (particularly in this specialty), with copies of 1–3 recent testimonials, should be sent not later than 31st January, 1951. JOHN H. YOUNG, House Governor and Secretary.

ST. GILES' HOSPITAL, Camberwell, S.E.5. Required, HOUSE OFFICER (anæsthetic duties). Salary £350, £400, or £450 a year, according to experience. Appointment tenable for 6 months in first instance. Resident post with deduction at rate of £100 a year for board, lodging, and other services provided.

Applications, stating age, details of qualifications, and experience, and enclosing copy testimonials, to the Secretary, Camberwell Hospitals Management Committee, Dulwich Hospital, S.E.22, as soon as possible.

ST. STEPHEN'S HOSPITAL, Fulham-road, Chelsea, S.W.10. HOUSE PHYSICIAN (first or second post), resident, for general medical wards. National scale salary.

Applications giving names of 2 personal referees to the Medical Superintendent as soon as possible.

ST. STEPHEN'S HOSPITAL, Fulham-road, Chelsea, S.W.10. HOUSE SURGEON (first or second post), resident. Recognised for the purposes of the F.R.C.S. (Eng.). National scale salary.

Applications giving names of 2 personal referees to the Medical Superintendent as soon as possible.

ST. ANDREW'S HOSPITAL, Bow, E.3. Required, House SURGEON to the Obstetric and Gynæcological Department from 1st February, 1951. Post tenable for 6 months. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Applications, stating age and qualifications, should be sent to the Medical Superintendent, St. Andrew's Hospital, Bow, E.3.

ST. GEORGE'S HOSPITAL, S.W.1. Applications invited for post of FIRST ASSISTANT to the Radiological Department at St. George's Hospital, which falls vacant on 1st February, 1951. The successful applicant will be placed in the grade of Registrar or Senior Registrar according to experience and qualifications. The appointment is for 1 year in the first instance.

Applications, together with the names of 2 referees, should be sent not later than 12th January, 1951, to—

P. H. CONSTABLE, House Governor.

AMENDED ADVERTISEMENT

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of RESIDENT OBSTETRIC ASSISTANT in the grade of House Officer at this Hospital, vacant on the 1st March, 1951. The person appointed should be prepared to commence duties with effect from 14th February, 1951.

Applications must be received by the undersigned not later than 3rd February, 1951. P. H. CONSTABLE, House Governor.

ST. JOHN'S HOSPITAL, Lewisham, London, S.E.13. (General—112 Beds.) LEWISHAM GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON (second or third post), vacant on 1st January, 1951. 6 months' appointment. Salary £400 or £450 p.a., according to experience, less £100 p.a. for residential emoluments.

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials or names of referees, should be sent to the Secretary at St. John's Hospital, Mordenhill, Lewisham, S.E.13, as soon as possible.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (Acute General—164 Beds.) CENTRAL GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON. The appointment is for 6 months only, and the salary, depending upon the number of previous posts held, £350, £400, or £450 p.a., less a residential charge of £100 p.a.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 testimonials, should be sent to the Medical Superintendent by 16th January, 1951.

ST. MARY'S HOSPITAL, London, W.2. Applications invited for post of REGISTRAR to the Pædiatric Department of St. Mary's Hospital. The duties of this post include work at the constituent Children's Hospitals within the St. Mary's group and in the Neonatal Department. Previous experience in pædiatrics is necessary. Preference will be given to candidates holding the M.R.C.P. The appointment will be for a first period of 12 months and the successful candidate will be eligible for re-election for a second year but not ordinarily for a longer period. The grading of this post is either Registrar or Senior Registrar according to the candidate's experience.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, with grading, together with the names and addresses of 3 referees, should reach the undersigned by 20th January, 1951.

20th December, 1950. ALAN POWDITCH, House Governor.

ST. MARY'S HOSPITAL, London, W.2. Applications invited for post of REGISTRAR to the E.N.T. Department of St. Mary's Hospital. Candidates must be Fellows of the Royal College of Surgeons of England or graduates in surgery of a British university. The appointment will be for a first period of 12 months, and the successful candidate will be eligible for re-election for a second year but not ordinarily for a longer period. The grading of this post is either Registrar or Senior Registrar according to the candidates experience.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, with grading, together with the names and addresses of 3 referees, should reach the undersigned by 20th January, 1951.

20th December, 1950. ALAN POWDITCH, House Governor.

ST. MARY'S HOSPITAL, London, W.2. Applications invited for post of ASSISTANT RADIOLOGIST at St. Mary's Hospital. Candidates must be registered medical practitioners and possess a recognised Diploma in Radiology. The appointment will be for a first period of 12 months, and the successful candidate will be eligible for re-election. The grading of this post allows for the appointment of a Senior Registrar or Registrar and in the event of no application being received from a suitably qualified Senior Registrar, the appointment may be made in the Registrar grade.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, with grading, together with the names and addresses of 3 referees, should reach the undersigned by 20th January, 1951.

21st December, 1950. ALAN POWDITCH, House Governor.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Plaistow, London, E.13. Applications invited from registered medical practitioners (Male or Female) for appointment of RESIDENT MEDICAL OFFICER (Junior Registrar) at the above Hospital for a period of 12 months commencing 24th February, 1951. Salary at rate of £670 p.a., less a deduction of £130 p.a. for board-residence, &c. The appointment is subject to the National Health Service superannuation regulations.

Candidates should send their applications, together with copies of recent testimonials, not later than 13th January, 1951, to— M. J. HUNTLEY, Secretary,

West Ham Group Hospital Management Committee.
Stratford, London, E.15.

WESTMINSTER CHILDREN'S HOSPITAL, Westminster HOSPITAL TEACHING GROUP. HOUSE SURGEON required for 6 months from 1st March, 1951. Salary £400 or £450 p.a., according to experience, with deduction of £100 p.a., for residential emoluments.

Applications, with copies of testimonials, should be submitted by 12th January, to the Assistant Secretary, Westminster Children's Hospital, Vincent-square, London, S.W.1.

WEST LONDON HOSPITAL, Hammersmith, London, W.6. Applications invited from registered medical practitioners for the vacant post of CASUALTY OFFICER. 6 months' appointment. Salary in accordance with Junior Hospital Medical Officer scale.

Applications, stating age, medical school, qualifications and experience with dates, to be forwarded to Acting Secretary by 11th January, 1951.

WEST LONDON HOSPITAL, Hammersmith, London, W.6. Applications invited from registered medical practitioners for the following resident posts :—

HOUSE SURGEON (general and orthopædic).

HOUSE OFFICER to Special Departments.

Both appointments tenable for 6 months from 1st March, 1951.

Applications, stating age, medical school, qualifications and experience with dates, to be forwarded to Acting Secretary by 11th January, 1951.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. Applications invited for resident post of HOUSE SURGEON. Salary £350–£450 p.a., less £100 p.a. for residence. Appointment for 6 months from 1st February, 1951, plus 14 days locum duty from 17th January, 1951.

Applications, stating full particulars, with copies of 2 testimonials, to Assistant Secretary by 15th January, 1951.

Provincial

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for medical and surgical wards. 6 months' appointment, vacant early January. National Health Service salary and conditions of service.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

ASHTON-UNDER-LYNE. LAKE HOSPITAL. (600 Beds.) Applications are invited for the following appointment at above Hospital :—

HOUSE SURGEON (resident) at above Hospital but also for duty at Ashton Infirmary under same Consultant. The appointment will be limited to 6 months. Salary £350–£450 p.a., according to experience, less £100 p.a. for board and lodging, &c. R practitioners within 3 months of qualification also those holding first posts may apply.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 testimonials, should be forwarded to— R. W. MCVITY, Secretary, Ashton, Hyde and Glossop Hospital Management Committee.

Astley-road, Stalybridge, Cheshire.

APPLEY BRIDGE, near WIGAN. WRIGHTINGTON HOSPITAL. Applications are invited for the posts of HOUSE SURGEON and HOUSE PHYSICIAN to commence duty early in February. Terms and conditions of service as per national scale. The Hospital has 299 Beds (adults and children) for treatment of orthopædic tuberculosis and 52 Beds (adult) for the surgical treatment of pulmonary tuberculosis. Resident Surgeon-Superintendent, 3 Assistants, and Visiting Consultant Surgeons and Physicians. R practitioners may apply.

Applications to Surgeon-Superintendent, giving qualifications and names of 2 referees.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street, BIRMINGHAM, 3. Applications invited from registered medical practitioners for the post of CLINICAL ASSISTANT in the Outpatient Department, attending on Tuesday and Friday mornings, to take up duty on 1st January, 1951. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating full particulars of experience and qualifications, with the names of 2 referees, should be forwarded to J. PRESTON, Secretary, Hospital Management Committee.

Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 16. ST. CHAD'S HOSPITAL, Hagley-road. THE BIRMINGHAM (DUDLEY ROAD) GROUP OF HOSPITALS. Applications are invited for the following posts :—

(*a*) HOUSE PHYSICIAN (Male or Female).

(*b*) HOUSE SURGEON (Male or Female).

The appointments will be made in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, qualifications, and experience, with recent testimonials, to be sent not later than 20th January, 1951, to— J. PRESTON, Secretary, Hospital Management Committee.

Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. MARSTON GREEN MATERNITY HOSPITAL, Berwicks-lane, MARSTON GREEN. THE BIRMINGHAM (DUDLEY ROAD) GROUP OF HOSPITALS. Required, OBSTETRICS HOUSE OFFICER at the above Hospital, to take up duty on 1st February, 1951. The Hospital is recognised for purposes of D.Obst. R.C.O.G. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, particulars of qualifications, and experience, should be forwarded to the undersigned, together with the names of 2 referees.

J. PRESTON, Secretary, Hospital Management Committee.

Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. COLESHILL HALL, Coleshill, near BIRMINGHAM. (A Colony for Mental Defectives.) BIRMINGHAM GROUP 9 HOSPITAL MANAGEMENT COMMITTEE. Reliable LOCUM required to undertake duties of Junior Hospital Medical Officer for an indefinite period. Salary at the rate of £700 p.a., less residential emoluments of £150.

Applications and names for reference to be sent to the Medical Superintendent.

BIRMINGHAM. GROUP 25 BIRMINGHAM (SELLY OAK) HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the following positions :—

Selly Oak Hospital, Birmingham, 29 (1098 Beds)

RESIDENT CASUALTY OFFICER. Salary in accordance with the national scale for Junior Registrars, the appointment being tenable in the first instance for 6 months.

HOUSE PHYSICIANS.

HOUSE SURGEONS.

HOUSE SURGEONS (Gynæcological and obstetrical).

Above appointments vacant shortly. Salary according to the national scale for House Officers, the appointments being tenable in the first instance for 6 months.

Applications, giving age, experience, and qualifications, with copies of 3 recent testimonials, to the Medical Superintendent.

Birmingham Accident Hospital, Birmingham, 15 (209 Beds)

HOUSE SURGEON (Male or Female). The appointment will be for a period of 6 months, of which the first 2 will be with the Burns Unit (Medical Research Council) and the remainder in general traumatic service. The Hospital treats 50,000 new patients each year. The post offers practical experience in the treatment of all types of injury and includes a course of instruction on accident surgery given by the Consultant staff. Salary in accordance with the national scale for House Officers.

Detailed applications, accompanied by copies of recent testimonials, to be sent to the Administrator.

BIRMINGHAM. THE SKIN HOSPITAL. (61 Beds.) THE BIRMINGHAM (DUDLEY ROAD) GROUP OF HOSPITALS. Required, HOUSE OFFICER. The Inpatient Department is modern and well equipped and provides facilities for the study of skin diseases. The successful applicant will be required to assist Consultants at Outpatient Clinics.

Applications should be forwarded to the undersigned immediately. J. PRESTON, Secretary, Birmingham (Dudley Road) Group of Hospitals.

Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. QUEEN ELIZABETH HOSPITAL. Applications invited for the post of NON-RESIDENT ANÆSTHETIST REGISTRAR (Registrar or Senior Registrar grade). Duties to commence as soon as possible. Salary will be in accordance with the terms and conditions of service of hospital medical and dental staffs. Candidates should state dates on which they qualified for Part I and Part II of the D.A.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him not later than 20th January.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. GENERAL HOSPITAL. Applications are invited for the post of CASUALTY SURGICAL REGISTRAR (non-resident), Senior Registrar grade, for duty in the Casualty Department at the above Hospital. Candidates must be registered medical practitioners, have held a resident appointment in a teaching hospital, and should possess the F.R.C.S. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs.

Forms of application may be obtained from, and should be returned not later than 20th January to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BARNET GENERAL HOSPITAL, Barnet, Herts. Junior REGISTRAR (Casualty Officer) required. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs (England and Wales).

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be sent immediately to the Medical Director.

BARNET GENERAL HOSPITAL, Barnet, Herts. House PHYSICIAN (first or subsequent appointment). 6 months' appointment from 12th January, 1951. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, experience, qualifications, together with copies of 3 recent testimonials, should be sent immediately to the Medical Director of the Hospital.

BATH. ROYAL UNITED HOSPITAL. Required, House PHYSICIAN. Commencing date 5th February, 1951. Salary and conditions of Service in accordance with those laid down by the Ministry of Health.

Applications, stating age, qualifications, and experience, with 3 recent testimonials, to be received by undersigned as soon as possible. J. LAWRENCE MEARS, Secretary, Bath Hospital Management Committee.

Manor Hospital, Bath.

BUXTON, DERBYSHIRE. DEVONSHIRE ROYAL HOSPITAL. (A National Hospital for the treatment of Rheumatic Diseases.) SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for the temporary appointment of HOUSE PHYSICIAN. Ministry of Health terms and conditions of service. Post offers excellent opportunities for any practitioner desiring to prepare a thesis or wishing to undertake special work.

Applications, stating age, qualifications, and experience, and names of 2 referees, to be forwarded to the General Superintendent at the Hospital immediately.

BRISTOL. STAPLETON HOSPITAL, Fishponds, Bristol. A vacancy will occur on 1st April, 1951, for a RESIDENT MEDICAL OFFICER for duty primarily in the Geriatric Unit within the Hospital which has a daily average of 840 patients. Post graded Junior Hospital Medical Officer. Salary scale £700–£50–£1000, less £150 for board, lodging, and other services provided. The commencing point within the scale will be determined by the successful applicant's previous service in the grade. Terms and conditions of service are those laid down by the National Health Service regulations.

Applications, giving date of birth, nationality, experience, and qualifications, with copies of 2 recent testimonials, or the names and addresses of 2 referees, to be forwarded to the undersigned within 14 days of the appearance of this advertisement.

D. PEARSON, Secretary.

Stapleton Hospital, 200, Manor-road, Fishponds, Bristol.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. COSSHAM MEMORIAL HOSPITAL. (101 Beds—General and Casualty.)

HOUSE PHYSICIAN (first post) required 1st March, 1951.

HOUSE SURGEON AND CASUALTY OFFICER (first post) required 1st March, 1951.

National salary scale and conditions.

Applications, with full particulars, should be sent to the Group Secretary, Frenchay Hospital, Bristol.

BRADFORD ROYAL INFIRMARY. Senior House SURGEON for general and urological surgery. Salary £400–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, to Secretary.

BRADFORD ROYAL INFIRMARY. House Surgeon required. Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary.

BRADFORD ROYAL INFIRMARY. Orthopædic and ACCIDENT HOUSE SURGEON required. Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, along with copy testimonials, to Secretary.

BRADFORD ROYAL INFIRMARY. House Surgeon (Thoracic Unit) required. Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary.

BRADFORD. ST. LUKE'S HOSPITAL. House PHYSICIAN required. Salary £350–£450 p.a., according to experience, less £100 p.a. in respect of emoluments.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Royal Infirmary, Bradford.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. Required, ORTHOPÆDIC HOUSE OFFICER, first, second, or third post, at above Hospital. Salary first post £400, second post £450, and third post £500, less a deduction of £100 for board and lodging.

Applications, with copies of 3 recent testimonials, should be sent as soon as possible to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester.

BURTON-ON-TRENT. GENERAL INFIRMARY. (Acute General Hospital—235 Beds.) Required, HOUSE PHYSICIAN (resident). Salary range £350–£450 in accordance with Ministry of Health terms.

Applications, with all details and copies of testimonials, to be forwarded immediately to—

J. E. SMITH, Secretary,
Burton-on-Trent Hospital Management Committee.

BURY GENERAL HOSPITAL. (184 Beds.) Required, HOUSE SURGEON. Post recognised for the F.R.C.S. Hospital is mainly surgical and experience can be gained in orthopædic and E.N.T. work. Salary and conditions of service in accordance with national scale.

Applications, giving full details of qualifications and experience, should be made immediately to—

H. WILKINSON, Secretary,
Bury and Rossendale Hospital Management Committee.
Bury General Hospital, Bury, Lancs.

BURY GENERAL HOSPITAL, Bury, Lancs. (An Acute General Hospital of 178 Beds, mainly surgical with beds for orthopædic and other specialties.) Required, JUNIOR ANÆSTHETIC REGISTRAR (resident or non-resident). Post vacant 31st December, and is recognised for the D.A. Tenure of appointment 1 year. Salary, &c., in accordance with the terms and conditions of service for hospital medical and dental staffs (England and Wales), that is, £670 p.a., non-resident (with a deduction of £100 where the post is resident).

Applications, stating age, nationality, qualifications, and experience, with copies of 2 testimonials, should be forwarded immediately to undersigned, from whom further particulars can be obtained. H. WILKINSON, Secretary,
Bury and Rossendale Hospital Management Committee.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE.

Florence Nightingale Hospital, Bury (120 Beds for Infectious Diseases)

Aitken Sanatorium, Holcombe, near Bury (70 Beds for Tubercle)

A vacancy exists for a HOUSE PHYSICIAN to work between these Hospitals. Applicants should have held previous House Officer posts. Salary and conditions of service will be in accordance with those laid down for hospital medical and dental staffs.

Applications should be made immediately to—

H. WILKINSON, Secretary to the Committee.
Bury General Hospital, Walmersley-road, Bury, Lancs.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

Townleys Hospital (521 Beds, including 109 for Obstetrics and 63, plus Premature Nursery, for Pædiatrics—Junior Medical Establishment of 15)

RESIDENT JUNIOR REGISTRAR for the Department of Pædiatrics, post vacant 1st January and tenable for 12 months. Previous experience in pædiatrics essential and possession of the D.C.H. would be an advantage. The duties will include the supervision of new-born and premature infants in addition to the care of sick children. Salary £670 p.a.

The Royal Infirmary, Bolton (235 Beds—Junior Medical Establishment of 10)

(*a*) RESIDENT HOUSE SURGEON, principally for duties in Casualty, Orthopædic, and Ophthalmic Departments, post vacant immediately.

(*b*) RESIDENT HOUSE SURGEONS (3) for general surgical duties, posts vacant 1st January, 10th January, and 12th February, 1951.

Appointments will be for 6 months with salary £350, £400, or £450 p.a., according to experience. Conditions of service for all appointments in accordance with the terms issued by the Ministry of Health. Appropriate charges will be made for residence.

Applications, stating age, nationality, qualifications, and experience, together with the names of 2 persons to whom reference may be made, to be sent to the undersigned at the Royal Infirmary, Bolton, as soon as possible.

H. P. TRAVIS, Secretary.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (240 Beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, ORTHOPÆDIC HOUSE SURGEON. Appointment vacant early in January, 1951, and limited to 6 months. Previous experience in orthopædic surgery an advantage. Post is recognised for the F.R.C.S. Diploma. Salary £400 or £450 p.a., according to number of posts held, with a deduction of £100 p.a. for residential emoluments.

Applications, giving age, full particulars of qualifications with dates, and experience, with copies of 3 recent testimonials, should be forwarded as soon as possible to M. D. KAY, Chief Administrative Officer at the Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (240 Beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, SENIOR HOUSE SURGEON (Male), post vacant early in January, 1951. Appointment for 6 months. Appointment is recognised for the F.R.C.S. Diploma, and salary will be £400 or £450 p.a., according to the number of posts held, with a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications with dates, and details of previous experience, with copies of 3 recent testimonials, should be forwarded as soon as possible to M. D. KAY, Chief Administrative Officer at the Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (240 Beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, OBSTETRICAL AND GYNÆCOLOGICAL HOUSE SURGEON, post becomes vacant in January, 1951. Appointment for a period of 6 months. Appointment is recognised for the D.Obst. R.C.O.G., and the salary will be £400 or £450 p.a., according to the number of posts held, with a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications with dates, and details of previous experience, together with copies of 3 recent testimonials, should be forwarded as soon as possible to M. D. KAY, Chief Administrative Officer at the Hospital.

CANTERBURY. ST. AUGUSTINE'S HOSPITAL, CHARTHAM DOWN, near CANTERBURY. Applications invited by the Management Committee of the above Hospital for Mental and Nervous Disorders from registered practitioners (Male or Female) for post of RESIDENT SENIOR HOUSE OFFICER for tenure of 1 year. Salary in accordance with terms and conditions of service for hospital medical staff—i.e., £670 p.a. Unmarried accommodation is available in the Hospital, for which a charge of £150 will be made.

Apply, stating nationality, age, sex, qualifications, and experience, with names of 3 referees, to the Medical Superintendent within 14 days of this advertisement.

CHELMSFORD AND ESSEX HOSPITAL. 2 House SURGEONS required, 1 to commence beginning of January and 1 beginning of February. Salary according to National Health Service scale.

Apply, Secretary, Hospital Management Committee, Chelmsford Group, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL, London-road, CHELMSFORD. JUNIOR REGISTRAR (Casualty Officer) required at above Hospital. To commence immediately. Salary according to National Health Service scale.

Apply to Secretary, Hospital Management Committee—Chelmsford Group, London-road, Chelmsford.

CHELMSFORD AND ESSEX AND ST. JOHN'S HOSPITALS. HOUSE SURGEON required to work at above Hospitals. Salary according to National Health Service scale.

Apply to Secretary, Hospital Management Committee—Chelmsford Group, London-road, Chelmsford.

CHESTERFIELD HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required in the specialty of Geriatrics for duty in 182 Bedded unit at Scarsdale and Penmore Hospitals, Chesterfield. Ministry of Health salary—£700–£50–£1000 p.a., less appropriate deduction where resident—and conditions of service.

Applications, stating age, qualifications, experience, &c., with the names of 3 referees, to—

M. H. BOONE, Secretary,
Chesterfield Hospital Management Committee.
Royal Hospital, Chesterfield.

CHESTER. UPTON MENTAL HOSPITAL. Psychiatric JUNIOR HOSPITAL MEDICAL OFFICER required. Salary £700–£50–£1000 p.a. Accommodation available for single Man and for which a charge will be made. All forms of modern treatment available, including Insulin Unit. There are psychiatric outpatient clinics at 3 General Hospitals, occupational therapy units and voluntary treatment wards. Facilities given to study for higher qualifications.

Apply Medical Superintendent.

CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR (resident) required 14th March, 1951, for duty primarily at the Royal West Sussex Hospital, Chichester (202 Beds). The Medical Registrar has the care, under the 2 Consultant Physicians and with the assistance of a House Physician, of 55 adult medical beds and 10 children's beds. He also assists the Dermatologist and Physical Medicine Physician. The appointment is subject to the current agreed terms and conditions of service of hospital medical and dental staffs and to the National Health Service superannuation regulations. Salary £775 first year, £890 second year, each less £150 p.a. for residence. Candidates may visit the Hospital, but canvassing will disqualify.

Forms of application to be had from Group Secretary, Royal West Sussex Hospital, Chichester, and to be submitted not later than 22nd January.

DARLINGTON MEMORIAL HOSPITAL. Required, RESIDENT ANÆSTHETIST (Male or Female). National Health Service superannuation regulations in force. Previous experience in anæsthesia an advantage, but not essential (trainee post).

Apply, with references and full details, forthwith to—

G. W. BECKWITH, Secretary,
Darlington District Hospital Management Committee.

DARLINGTON MEMORIAL HOSPITAL. Required, CASUALTY OFFICER (Male or Female). Salary in accordance with national scale.

Apply, with references, stating age and experience, to—

G. W. BECKWITH, Secretary.

DEWSBURY, BATLEY AND MIRFIELD HOSPITAL MANAGEMENT COMMITTEE. Required, JUNIOR HOSPITAL MEDICAL OFFICER in the specialty of pædiatrics. Post is resident and subject to 1 month's notice on either side. Duties to be carried out at hospitals in the Group. Salary according to national scale.

Applications, stating age, qualifications, and nationality, with names of 2 referees, should be forwarded to the Secretary, Dewsbury, Batley and Mirfield Hospital Management Committee, 20, Oxford-road, Dewsbury.

DEWSBURY. THE GENERAL HOSPITAL. House OFFICER (surgical), third or subsequent appointment, to assist Consultant Ophthalmic Surgeon. Recognition of the Hospital as a training centre for the Diploma in Ophthalmology is under consideration. Terms and conditions of service as laid down for hospital medical and dental staffs (England and Wales).

Applications, giving full particulars and names of 3 referees, to undersigned at 20, Oxford-road, Dewsbury.

G. W. BATCHELOR, Secretary,
Hospital Management Committee No. 11,
Dewsbury, Batley and Mirfield Group.

DODDINGTON, CAMBS. COUNTY HOSPITAL. (120 Beds.) EAST ANGLIAN REGIONAL HOSPITAL BOARD. Required, RESIDENT MEDICAL OFFICER at above Hospital. Commencing salary £775 p.a., rising to £890 p.a. in second year of tenure. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications (7 copies), stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, should be sent to the undersigned not later than 22nd January, 1951. Candidates are invited to visit the Hospital by direct arrangement with the Surgeon-Superintendent, County Hospital, Doddington, Cambs.

K. V. F. MORTON, Secretary.
117, Chesterton-road, Cambridge.

DONCASTER ROYAL INFIRMARY. (Recognised under the Regulations for the examinations of the R.C.S.) Required, ORTHOPÆDIC HOUSE SURGEON in the grade of Senior House Officer. Salary at rate of £670 p.a., from which a deduction at rate of £130 p.a. will be made for board, residence, &c.

Applications, stating age, education, qualifications, and details of present and previous appointments with dates, together with copies of 3 testimonials, should be forwarded to reach the undersigned immediately.

ARTHUR JONES, Secretary
Doncaster Hospital Management Committee.

DORCHESTER. DORSET COUNTY HOSPITAL. (144 Beds.) HOUSE PHYSICIAN (Male or Female) required, post vacant mid-February, 1951. Post tenable for 6 months. Appropriate Ministry of Health salary according to experience, less £100 p.a. for residence.

Applications, giving details of age, experience (if any), qualifications, and nationality, together with copies of testimonials, to be sent to the Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. (300 Beds—10 Resident Medical Staff employed.) EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Required, RESIDENT MEDICAL OFFICER, post vacant 13th February, 1951. Salary, &c., in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales) for a Junior Registrar. Applicants should have had previous experience. The appointment is for a period of 12 months.

Applications, with copies of 2 recent testimonials, should be forwarded on or before 13th January, 1951, to the Senior Administrative Officer.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION. Applications invited from registered practitioners for following appointments :—

The Guest Hospital, Dudley (154 Beds)
CASUALTY OFFICER, post now vacant.
RESIDENT ANÆSTHETIST, post now vacant.
HOUSE PHYSICIAN, post vacant 16th January, 1951.
Corbett Hospital, Stourbridge (106 Beds)
CASUALTY OFFICER, post now vacant.
Prestwood Sanatorium (200 Beds)
RESIDENT HOUSE OFFICER, post vacant 9th January, 1951.

Applications, stating age, experience, with copies of 3 recent testimonials, to— H. RAYMOND HURST,
Secretary to the Management Committee.
The Guest Hospital, Dudley.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. (515 Beds.) ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE SURGEON (second or third post), required 25th February, 1951, for general surgical duties. Post, which is tenable for 6 months, is recognised for the F.R.C.S. Salary and conditions as prescribed by the Ministry of Health. R practitioners holding first posts may apply.

Applications, stating age, nationality, qualifications, and experience, with the names of 2 referees, to the Medical Director of the Hospital by 24th January, 1951. Canvassing disqualifies.

EPPING. ST. MARGARET'S HOSPITAL. (500 Beds.) Applications invited for the posts of :—

(*a*) HOUSE SURGEON (first post),
(*b*) HOUSE PHYSICIAN (first post),

at the above Hospital. Salary for each post on National Health Service scale—viz., £350 p.a., less a deduction at the rate of £100 p.a. for board and lodging and other services provided. The successful candidates will be required to take up their appointments in mid-February, 1951.

Applications in writing, together with copies of 2 recent testimonials, to reach the Secretary, Epping Group Hospital Management Committee, St. Margaret's Hospital, Epping, Essex, not later than 13th January, 1951.

FARNBOROUGH HOSPITAL. (800 Beds.) Casualty OFFICER required. The post is tenable for 6 months. Salary £350–£450 p.a., less £100 a year in respect of board and lodging and other services provided.

Applications should be sent to the Administrative Officer, Farnborough Hospital, Farnborough, Kent, not later than 19th January, 1951.

FARNHAM HOSPITAL, Hale-road, Farnham, Surrey. SENIOR SURGICAL OFFICER for duties in wards and casualty. Appointment for 1 year. Salary £670 p.a.

Applications by letter, stating age, qualifications, experience, and present appointment, with 1–3 recent testimonials (copies), to the Medical Superintendent of the Hospital.

GLASGOW, N. STOBHILL HOSPITAL. Vacancies for HOUSE OFFICERS exist in the following units for the 6 months' term beginning 1st February :—

E.N.T. Unit (74 Beds).
Phthisical Unit (38 Beds).
Psychiatric Unit (314 Beds).

Applications should be submitted immediately to the Medical Superintendent.

GRIMSBY GENERAL HOSPITAL. (220 Beds.) Grimsby HOSPITALS MANAGEMENT COMMITTEE. Required, MEDICAL SENIOR HOUSE OFFICER (resident). The appointment, which is vacant now, is tenable for 1 year and subject to National Health Service terms and conditions. Salary £670 p.a., less a deduction for residence.

Apply, immediately, to the Administrative Officer, Grimsby General Hospital, Grimsby.

GUILDFORD. ST. LUKE'S HOSPITAL. Guildford GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE PHYSICIAN at the above Hospital for duties in medical unit with acute and chronic beds. 6 months' appointment vacant 1st February, 1951. Salary and conditions in accordance with National Health Service scale and terms of appointment.

Applications, giving full details of qualifications, and experience, together with copies of 3 recent testimonials, should be forwarded as soon as possible to the Physician-Superintendent, St. Luke's Hospital, Guildford.

HALIFAX. ROYAL HALIFAX INFIRMARY. Resident ANÆSTHETIST. Hospital providing large surgical turnover. Facilities available for practical experience under guidance of Consultant staff. Ample opportunities for studying for D.A.

Applications, stating age, sex, qualifications, and experience, with copies of 3 recent testimonials, to the Secretary, Halifax Area Hospitals Management Committee, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. Required, HOUSE SURGEON (Male) to the Ophthalmic and E.N.T. Departments at this busy acute General Hospital. The post includes part-time casualty duty and is recognised for the D.O. and is vacant early January.

Applications, stating age, qualifications, and experience, with 3 recent testimonials, to be forwarded to the Secretary.

HARROGATE ROYAL BATH HOSPITAL, Cornwall-road, HARROGATE. (146 Beds—this is a National Hospital for the treatment of rheumatism and allied diseases and is the centre of rheumatism research in the area.) Required, SENIOR HOUSE OFFICER (Surgical Orthopædic Unit). Previous orthopædic experience desirable but not essential. Salary at rate of £670 p.a., subject to a deduction in respect of board and lodging. The appointment is also subject to the National Health Service (Superannuation) Regulations, 1950.

Applications to be forwarded to the Secretary, Harrogate and Ripon Hospital Management Committee, Hereford Lodge, Cornwall-road, Harrogate, as soon as possible.

HARROGATE ROYAL BATH HOSPITAL, Cornwall-road, HARROGATE. (146 Beds—a National Hospital for the treatment of rheumatic and allied diseases.) HARROGATE AND RIPON HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT MEDICAL OFFICER. This Hospital is recognised as having an authorised Physical Medicine Department, and time spent in the above post will afford good experience in physical medicine and orthopædics and will count towards the qualifying 12 months for the Diploma in Physical Medicine. Salary in accordance with the National Health Service scale, and subject to the National Health Service (Superannuation) Regulations, 1950. The appointment will be for a period of 6 months.

Applications to be forwarded to the Assistant Secretary, Royal Bath Hospital, Cornwall-road, Harrogate, immediately.

HARROGATE AND RIPON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics). The person appointed will work under the direction of the Consultant Anæsthetist mainly at the Harrogate and District General Hospital, but will also be required, when necessary, to undertake duty at any of the other hospitals in the group. Salary £670 p.a., subject to a deduction in respect of board and lodging. The appointment will be subject to the passing of a medical examination and the provisions of the National Health Service (Superannuation) Regulations, 1950.

Applications, stating age, experience, and qualifications, to be forwarded to the Secretary, Harrogate and Ripon Hospital Management Committee, Hereford Lodge, Cornwall-road, Harrogate.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (160 Beds.) Applications invited for following appointments :—

RESIDENT SURGICAL OFFICER (Male). 6 months' appointment. Salary £450 p.a., less £100 p.a. for residential emoluments.

HOUSE SURGEON (Male or Female). 6 months' appointment. Salary £350–£450 p.a., according to previous posts held, less £100 p.a. for residential emoluments.

Applications in writing, stating age, qualifications with dates, and nationality, with copies of 3 testimonials, to be sent immediately, addressed to the undersigned at Pembroke County War Memorial Hospital, Haverfordwest.

A. W. YOUNGS, Secretary,
West Wales Hospital Management Committee.

HEMEL HEMPSTEAD. WEST HERTS HOSPITAL. (170 Beds.) WEST HERTS GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (second or third post), vacant 14th February, 1951. Salary and conditions of service in accordance with the National Health Service terms.

Applications, stating age, and giving full details of qualifications and previous experience, and accompanied by copies of 2 recent testimonials, should be submitted to the Administrator at the Hospital as soon as possible.

HEMEL HEMPSTEAD. WEST HERTS HOSPITAL. (170 Beds.) WEST HERTS GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (second or third post), vacant 14th February, 1951. The post offers excellent experience in general medicine. Salary and conditions of service in accordance with the National Health Service terms.

Applications, stating age, and giving full details of qualifications and previous experience, and accompanied by copies of 2 recent testimonials, should be submitted to the Administrator at the Hospital as soon as possible.

HITCHIN, HERTS. THE LISTER HOSPITAL. (236 Beds.) Required, RESIDENT HOUSE SURGEON (first or second post) to commence 1st February, 1951. The appointment will be for 6 months in the first instance. Salary and conditions of service in accordance with National Health Service regulations.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, should be sent immediately to the Medical Director, The Lister Hospital, Hitchin.

HULL. KINGSTON GENERAL HOSPITAL. (398 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE OFFICERS (1 medical, 1 surgical) are required at the above Hospital. Post is resident and tenable for 6 months. Salary £350, £400, or £450 per year, according to experience.

Applications should be addressed to the Administrative Officer at the above Hospital.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. ORTHOPÆDIC HOUSE SURGEON required, vacant now. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. HOUSE SURGEON required, vacant now. Recognised for F.R.C.S. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice on either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. HOUSE SURGEON required in the E.N.T. Department at the Hull Royal Infirmary and the Victoria Hospital for Sick Children. Recognised for D.L.O. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice on either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. Applications invited for post of SECOND CASUALTY OFFICER (second or third post), vacant now. Salary in accordance with the national scale. 6 months' appointment, terminable at any time by 1 month's notice on either side.

Forms of application from the Administrative Officer.

HEREFORD. GENERAL HOSPITAL. (154 Beds.) Required, HOUSE OFFICER (medicine), vacant as from 6th February, 1951. Salary at rate of £350 or £400 p.a., less emoluments. Conditions of service applicable to hospital medical and dental staffs (England and Wales).

Applications, with copies of 2 recent testimonials, should be sent to the Secretary, Herefordshire Hospital Management Committee, County Hospital, Hereford.

HORNCHURCH, ESSEX. ST. GEORGE'S HOSPITAL. Required, JUNIOR HOSPITAL MEDICAL OFFICER. This Hospital at present accommodates chronic sick patients and offers excellent geriatric experience. The present beddage is for 268 chronic sick patients which will later be increased. Salary, &c., in accordance with nationally agreed terms and conditions of service for hospital medical and dental staffs.

Applications, stating (in order) age, nationality, qualifications with dates, present and previous appointments, and details of experience, should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, with copies of 2 most recent testimonials or names of 2 referees.

HUDDERSFIELD ROYAL INFIRMARY. (321 Beds.) HOUSE SURGEON required to commence duties on 22nd February, 1951. Salary in accordance with terms and conditions of service for hospital medical and dental staffs, with full residential emoluments.

Applications, together with copies of 3 recent testimonials, to be addressed as soon as possible to—

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (321 Beds.) HOUSE PHYSICIAN required to commence duty 22nd February, 1951. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs.

Applications, together with copies of 3 recent testimonials, should be addressed to—

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (321 Beds.) HOUSE SURGEON required to commence duties on 27th January, 1951. Salary in accordance with terms and conditions of service for hospital medical and dental staffs, with full residential emoluments.

Applications, together with copies of 3 recent testimonials, to be addressed as soon as possible to—

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

ILFORD. KING GEORGE HOSPITAL. There will be a vacancy for a CASUALTY OFFICER at the above Hospital on 31st January, 1951, at a salary of £670 p.a., less £120 p.a. emoluments.

Applications, giving full particulars, and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

G. AUSTIN HEPWORTH, Secretary, Ilford and
Barking Group Hospital Management Committee.
King George Hospital, Ilford.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Senior HOUSE OFFICER (Junior Registrar), resident, full-time, required for Orthopædic Unit. Salary £670 p.a. Terms and conditions as approved for hospital medical staff.

Applications (endorsed "S.H.O. Orthopædic Unit, W.M.H."), stating age, nationality, qualifications, and experience, with copies of up to 3 recent testimonials, to Secretary, South West Middlesex Hospital Management Committee, 1, Churchfield-road, Ealing, W.13. Closing date 16th January, 1951.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. House OFFICER (second or third post), resident, to Department of Psychiatry. Previous medical experience essential and psychiatric experience an advantage. The department includes a neurosis centre and observation wards, and conducts an extensive outpatient service. Salary, terms, and conditions of service as approved for hospital medical staff.

Applications (endorsed "House Officer, Psychiatry, W.M.H."), stating age, nationality, qualifications, and experience, with copies of up to 3 recent testimonials, to the Secretary, South West Middlesex Hospital Management Committee, 1, Churchfield-road, Ealing, W.13, by 16th January, 1951.

IPSWICH. EAST ANGLIAN REGIONAL HOSPITAL BOARD. RESIDENT SURGICAL OFFICER (Junior) at the East Suffolk and Ipswich Hospital and Ipswich Borough General Hospital (660 Beds). Salary £775–£890 p.a. The terms and conditions of service for hospital medical and dental staffs will apply. Appointment for 1 year, renewable for second year.

Applications, stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, should be sent to the undersigned not later than 15th January, 1951. Candidates are invited to visit the Hospital by direct arrangement with the Hospital Management Committee Secretary at the East Suffolk and Ipswich Hospital.

K. V. F. MORTON, Secretary.

117, Chesterton-road, Cambridge.

LYMINGTON AND DISTRICT HOSPITAL, Lymington, HANTS. HOUSE PHYSICIAN and HOUSE SURGEON required, posts vacant 16th and 31st January respectively. Tenable for 6 months. Salary £350–£450 p.a., according to number of posts previously held, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by Ministry of Health.

Applications, with copies of testimonials, to be submitted as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

ISLE OF MAN. NOBLE'S HOSPITAL. Applications invited for post of HOUSE SURGEON (first post) in busy hospital with over 150 Beds and the usual ancillary departments. Post will provide ample and varied experience in pleasant surroundings. Salary £400 p.a., less £100 p.a. for board and lodging. Appointment for 6 months in first instance.

Applications, with copies of 2 recent testimonials, to the Secretary, Noble's Hospital, Douglas.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP (NO. 14). Required, RESIDENT HOUSE SURGEON (second or third post), E.N.T. and Ophthalmic Departments, post now vacant. Tenable for 6 months. Salary according to number of previous posts held, and conditions of service in accordance with terms and conditions of service of hospital medical staff.

Applications to be sent as soon as possible to—
Miss V. WELLS, Assistant Secretary.

LEEDS. JEWISH HERZL MOSER HOSPITAL. Required, JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital for the treatment of both medical and surgical cases. The appointment will be for a period of 1 year in the first instance. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs—namely, on the scale £700–£50–£1000, according to previous service in the grade, with an appropriate deduction for services provided. Self-contained flat available suitable for a married or single person.

Forms of application, obtainable from the undersigned, should be completed and returned not later than 20th January, 1951.
J. FOLKARD, Secretary,
Leeds A Group Hospital Management Committee.
Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the appointment of REGISTRAR to the Board in Anæsthetics for duties at hospitals within the Halifax Hospital Management Committee Group. Appointment will be for 1 year in the first instance. Remuneration in accordance with the terms and conditions of service of hospital medical and dental officers for the time being in operation and the appointment will be subject to the National Health Service (Superannuation) Regulations, 1950.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, 29/31, Eastgate, Leeds, 2, not later than 3rd February, 1951. Canvassing in any form will disqualify.

LEEDS REGIONAL HOSPITAL BOARD invites applications for 2 REGISTRAR appointments in the specialty of chest diseases. Initial duties will be with the Mass Radiography Service in Hull and Bradford respectively, under the immediate supervision of the senior chest physician in the area. Ample facilities will also be given for clinical work at the parent chest clinic, attendance at sanatoria and general hospitals, &c. After a satisfactory term in mass radiography, suitable candidates will be considered for a further period of training in selected Regional sanatoria. These are essentially trainee specialist posts, and only applicants possessing a first-rate clinical background in chest work will be considered. The appointments will be subject to the provisions of the National Health Service (Superannuation) Regulations, 1950, and the salaries and conditions of service will be in accordance with the terms and conditions of hospital medical and dental staffs.

Applications, stating age, experience, qualifications, and present appointment, together with the names of 3 referees, to be forwarded to the Secretary to the Board, 29/31, Eastgate, Leeds, 2, not later than 27th January, 1951. Canvassing in any form, either directly or indirectly, will disqualify.

LEEDS REGIONAL HOSPITAL BOARD invites applications from registered medical practitioners for post of REGISTRAR in Psychiatry to the Board for duties at Scalebor Park Hospital, Burley-in-Wharfedale, near Leeds. The Hospital (289 Beds) provides accommodation for private and National Health Service patients, and has a large turnover of cases. All forms of active treatment are given. Facilities will be available for the successful candidate to take part in training in all aspects of psychiatry in conjunction with the University of Leeds, Department of Psychiatry. The appointment will be subject to the National Health Service (Superannuation) Regulations, 1950, and the salary will be in accordance with the terms and conditions of service of hospital medical and dental staffs.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, 29/31, Eastgate, Leeds 2, not later than 3rd February, 1951. Canvassing in any form will disqualify.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited from registered medical practitioners for appointments as RESIDENT HOUSE OFFICERS (all specialties) at the Liverpool Royal Infirmary, David Lewis Northern Hospital, Royal Southern Hospital, and Liverpool Stanley Hospital for the period of 6 months from 1st April to 30th September, 1951. Applicants appointed to House Surgeon and Orthopædic House Surgeon posts at the Liverpool Royal Infirmary, the David Lewis Northern Hospital, and the Liverpool Stanley Hospital will be required to undertake some casualty work as part of their normal duties. Salary at rate of £350, £400, or £450 p.a., according to experience, less a deduction at rate of £100 p.a. for board and residence, in accordance with the agreed terms and conditions of service (House Officers). The appointments are subject to the National Health Service superannuation regulations.

Applications should be made on forms which may be obtained from the undersigned, to whom they should be returned by 17th January, 1951.
A. V. J. HINDS, Secretary,
The United Liverpool Hospitals.
80, Rodney-street, Liverpool, 1, 27th December, 1950.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL EAR, NOSE, AND THROAT INFIRMARY. Applications are invited from registered medical practitioners for appointments as RESIDENT HOUSE SURGEONS (E.N.T.) for the period of 6 months from 1st April to 30th September, 1951. Salary at rate of £350, £400, or £450 p.a., according to experience, less a deduction at rate of £100 p.a. for board and residence, in accordance with the agreed terms and conditions of service (House Officers). The appointments are subject to the National Health Service superannuation regulations.

Applications should be made on forms which may be obtained from the undersigned, to whom they should be returned by 17th January, 1951.
A. V. J. HINDS, Secretary,
The United Liverpool Hospitals.
80, Rodney-street, Liverpool, 1, 27th December, 1950.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited from registered medical practitioners for appointments as CASUALTY OFFICERS at the Royal Southern Hospital and the Royal Liverpool Children's Hospital for the period of 6 months from 1st April to 30th September, 1951. Salary at rate of £350, £400, or £450 p.a., according to experience, less £100 p.a. for board and residence, in accordance with the agreed terms and conditions of service (House Officers). The appointments are subject to the National Health Service superannuation regulations.

Applications should be made on forms which may be obtained from the undersigned, to whom they should be returned by 17th January, 1951.
A. V. J. HINDS, Secretary,
The United Liverpool Hospitals.
80, Rodney-street, Liverpool, 1, 27th December, 1950.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited from registered medical practitioners for appointments as RESIDENT HOUSE OFFICERS (medical, surgical, orthopædic, and casualty) at the above Hospital (City Branch and Heswall Branch) for the period of 6 months from 1st April to 30th September, 1951. The Hospital is recognised as giving the requisite experience for the D.C.H. Salary at rate of £350, £400, or £450 p.a., according to experience, less a deduction at rate of £100 p.a. for board and residence, in accordance with the agreed terms and conditions of service (House Officers). The appointments are subject to the National Health Service superannuation regulations.

Applications should be made on forms which may be obtained from the undersigned, to whom they should be returned by 17th January, 1951.
A. V. J. HINDS, Secretary,
The United Liverpool Hospitals.
80, Rodney-street, Liverpool, 1, 27th December, 1950.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. THE WOMEN'S HOSPITAL, LIVERPOOL. Applications are invited from registered medical practitioners for appointments as RESIDENT HOUSE SURGEONS (gynæcological) for the period of 6 months from 1st April to 30th September, 1951. Salary at the rate of £350, £400, or £450 p.a., according to experience, less a deduction at rate of £100 p.a. for board and residence, in accordance with the agreed terms and conditions of service (House Officers). The appointments are subject to the National Health Service superannuation regulations.

Applications should be made on forms which may be obtained from the undersigned, to whom they should be returned by 17th January, 1951.
A. V. J. HINDS, Secretary,
The United Liverpool Hospitals.
80, Rodney-street, Liverpool, 1, 27th December, 1950.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ST. PAUL'S EYE HOSPITAL. Applications are invited from registered medical practitioners for appointments as RESIDENT HOUSE SURGEONS (eye) for the period of 6 months from 1st April to 30th September, 1951. Salary at rate of £350, £400, or £450 p.a., according to experience, less a deduction at rate of £100 p.a. for board and residence, in accordance with the agreed terms and conditions of service (House Officers). The appointments are subject to the National Health Service superannuation regulations.

Applications should be made on forms which may be obtained from the undersigned, to whom they should be returned by 17th January, 1951.
A. V. J. HINDS, Secretary,
The United Liverpool Hospitals.
80, Rodney-street, Liverpool, 1, 27th December, 1950.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL MATERNITY HOSPITAL. Applications are invited from registered medical practitioners for appointments as RESIDENT HOUSE SURGEONS (obstetric) for the period of 6 months from 1st April to 30th September, 1951. Salary at rate of £350, £400, or £450 p.a., according to experience, less a deduction at rate of £100 p.a. for board and residence, in accordance with the agreed terms and conditions of service (House Officers). The appointments are subject to the National Health Service superannuation regulations.

Applications should be made on forms which may be obtained from the undersigned, to whom they should be returned by 17th January, 1951.
A. V. J. HINDS, Secretary,
The United Liverpool Hospitals.
80, Rodney-street, Liverpool, 1, 27th December, 1950.

MANSFIELD. HARLOW WOOD ORTHOPÆDIC HOSPITAL, near MANSFIELD, NOTTS. (340 Beds.) Required, RESIDENT HOUSE SURGEON (second or subsequent post). Salary in accordance with National Health Service scale.

Applications, stating age, qualifications, experience, and enclosing copies of 2 recent testimonials, to be sent to Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE OFFICER (orthopædics) at the above General Hospital. Appointment tenable for 6 months. Ministry of Health terms and conditions of service.

Applications, stating age, qualifications, and experience, to be forwarded to the Administrative Officer at the Hospital immediately.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE OFFICER to the Geriatric Unit at the above Hospital. Appointment tenable for 6 months. The Unit consists of active treatment wards for medical patients and an attached Chronic Sick Unit. Ministry of Health terms and conditions of service.

Applications, stating age, qualifications, and experience, to be forwarded to the Administrative Officer at the Hospital immediately.

MANCHESTER AND SALFORD HOSPITAL FOR SKIN DISEASES, Quay-street, MANCHESTER, 3. SALFORD HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN. Appointment for 6 months commencing 1st February, 1951. Salary in accordance with terms and conditions of service for hospital medical staff.

Applications, together with copies of 3 testimonials, should be addressed to the Superintendent, at the Hospital not later than 14 days after the appearance of this advertisement.

MANCHESTER. BAGULEY EMERGENCY HOSPITAL, WYTHENSHAWE. Required, JUNIOR SURGICAL REGISTRAR. The post is resident and will involve operative, clinic, and ward duties at Baguley and the Manchester Ear Hospital. Ministry of Health conditions of service. Salary £670 p.a., less deduction of £120 p.a. in respect of board-residence.

Applications, stating age, experience, and qualifications, to be forwarded not later than 18th January, 1951, to—

A. H. KEATES, Secretary,
South Manchester Hospital Management Committee.
Christie Hospital and Holt Radium Institute, Manchester, 20.

MANCHESTER, 19. THE DUCHESS OF YORK HOS-PITAL FOR BABIES. MANCHESTER BABIES' AND CHILDREN'S HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN (Male or Female) for 6 months from 15th February, 1951. Salary in accordance with Ministry's scale.

Applications, with copies of 3 testimonials, to be sent as soon as possible to the Administrative Officer at the Hospital.

MANCHESTER UNITED HOSPITALS. Manchester ROYAL EYE HOSPITAL. Required, HOUSE SURGEON. Salary £350–£450 p.a., according to the number of positions previously held, less £100 p.a. for residential emoluments. Appointment of a practitioner within 3 months of qualification and subject to National Service Acts would be limited to 6 months.

Applications, stating age, details of qualifications and experience, and nationality, should be forwarded immediately to H. R. NORTH, General Superintendent.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE (GROUP 13). Required, SENIOR HOUSE SURGEON in the E.N.T. Department at the above Hospital, which is recognised by the Royal College of Surgeons for the purposes of the D.L.O. Appointment for 12 months. Salary £670 a year, less £150 a year for residential emoluments, in accordance with the terms and conditions of service of hospital medical and dental staffs. Suitably qualified R practitioners holding second and third House Officer posts are invited to apply.

Applications, stating age, nationality, qualifications, experience, together with the names and addresses of 2 responsible persons to whom reference may be made as to professional ability and character, should be sent as soon as possible to the Secretary, Mid-Kent Hospital Management Committee, 103, Tonbridge-road, Maidstone, as soon as possible.

NEWCASTLE UPON TYNE. WALKER GATE HOS-PITAL. (315 Beds.) Required, HOUSE PHYSICIAN at the above Hospital. The duties are concerned mainly with the acute Medical and Fever Sections and to a lesser extent in the E.N.T. Department. Applicants should, if possible, have had previous pædiatric experience but the post is also one which a suitable newly qualified practitioner could fill. The usual National Health Service conditions of salary and service obtain.

Applications, with testimonials or the names of 2 referees, to be sent as soon as possible to—

K. C. BOOKER, Secretary,
Newcastle upon Tyne Hospital Management Committee.
Newcastle General Hospital, Westgate-road,
Newcastle upon Tyne, 4.

NEWCASTLE GENERAL HOSPITAL. Required, Senior HOUSE OFFICER in Anæsthetics. Salary and conditions as defined under terms and conditions of service of hospital medical and dental staffs (England and Wales) on the scale appropriate to Junior Registrars. The Hospital is recognised for training for the Diploma in Anæsthetics.

Applications, with the names of 3 referees, to be sent to—

K. C. BOOKER, Secretary,
Newcastle upon Tyne Hospital Management Committee.
Newcastle General Hospital, Westgate-road,
Newcastle upon Tyne, 4.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited from registered medical practitioners for the appointment of Whole-time SENIOR REGISTRAR in the Children's Department of the Royal Victoria Infirmary. The department is responsible for the care of patients in the children's wards and outpatient clinic of the Royal Victoria Infirmary and the Babies Hospital, and for the care of infants in the pædiatric unit of the Princess Mary Maternity Hospital. This is the teaching hospital of the University of Durham and the successful candidate will be required to teach in his subject. The appointment which will be at the level of Senior Registrar is for 1 year in the first instance and will be subject to Ministry of Health terms and conditions of service. Salary for the first year will be at rate of £1000 p.a.

Applications, giving age, nationality, experience, and qualifications, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in the Children's Department of the Royal Victoria Infirmary. The department is responsible for the care of patients in the children's wards and outpatient clinic of the Royal Victoria Infirmary and the Babies Hospital, and for the care of infants in the pædiatric unit of the Princess Mary Maternity Hospital. This is the teaching hospital of the University of Durham. The appointment, which is non-resident, is for 1 year and will be subject to Ministry of Health terms and conditions of service. Salary is at rate of £670 p.a.

Applications, giving age, nationality, experience, and qualifications, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER to the Department of Psychological Medicine of the Royal Victoria Infirmary. This is the teaching hospital of the University of Durham and the successful candidate will have opportunity for clinical experience in inpatient and outpatient work under the direction of the Head of the department. He will also be responsible for clinical emergency duty as required. The appointment, which is non-resident, is for 1 year and will be subject to Ministry of Health terms and conditions of service. Salary is at rate of £670 p.a.

Applications, giving age, nationality, experience, and qualifications, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited from registered medical practitioners for the appointment of Whole-time REGISTRAR in the Department of Psychological Medicine. This is the teaching hospital of the University of Durham and the successful candidate, who will work under the direction of the Head of the department, will be expected to undertake some teaching in his subject. The appointment, which is non-resident, is for 1 year in the first instance and will be subject to Ministry of Health terms and conditions of service. Salary is at rate of £775 p.a.

Applications, giving age, nationality, experience, and qualifications, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NORTHAMPTON GENERAL HOSPITAL. (487 Beds.) NORTHAMPTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Required, ORTHOPÆDIC HOUSE SURGEON, post vacant about the middle of February next. Recognised for the F.R.C.S. Appointment will be made for period to 30th September, 1951. Ministry of Health salary scale, with deduction of £100 a year for residential emoluments.

Applications, giving full particulars, and enclosing copies of 3 recent testimonials, should be received by the undersigned before or on 18th January, 1951.

S. G. HILL, Secretary to the Management Committee.

NORTHAMPTON. MANFIELD ORTHOPÆDIC HOS-PITAL. (200 Beds.) NORTHAMPTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Required, ORTHOPÆDIC SENIOR HOUSE OFFICER (resident), post vacant early in January. The appointment will be for 1 year. Salary £670 p.a., with a deduction at rate of £100 p.a. for residential emoluments. The post will provide experience in a wide range of orthopædic treatment, including outpatient clinics.

Applications, stating age, nationality, qualifications, and experience, together with copies of testimonials, should be sent immediately to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton.

NUNEATON. GEORGE ELIOT HOSPITAL. (289 Beds.)

Applications are invited for the following appointments :—

HOUSE SURGEON for general surgical duties, post vacant 31st January.

HOUSE PHYSICIAN for general medical duties including a developing Pædiatric Unit, now vacant.

National scale of salaries.

Applications, with full details, and 2 copy testimonials, to be sent to the Secretary, Group 20 Hospital Management Committee, Coventry and Warwickshire Hospital, Stoney Stanton-road, Coventry.

NOTTINGHAM GENERAL HOSPITAL. Required, JUNIOR CASUALTY OFFICER (first post), Male or Female, for the above Hospital. Duties to commence as soon as possible. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, and nationality, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,
Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, JUNIOR AURAL REGISTRAR (resident), duties to commence immediately. Salary and conditions of service to be in accordance with the published conditions of the National Health Service. The E.N.T. Department has 53 Beds and a large Outpatient Department and is recognised for the D.L.O.

Applications to be addressed to undersigned, stating age, qualifications, and experience, with copies of testimonials.

HENRY M. STANLEY, Secretary,
Nottingham Area No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, HOUSE SURGEON (Male or Female) for above Hospital. If held by an R practitioner appointment will be for 6 months. Salary and conditions of service in accordance with the published conditions of the Ministry of Health, less £100 p.a. for emoluments. Duties to commence on or about 2nd January, 1951.

Applications, stating age, qualifications, and experience, with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,
Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. (439 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Applications invited for the resident post of Whole-time SENIOR SURGICAL REGISTRAR to the above Hospital. Candidates should have a good general medical and surgical background and must be in possession of the Fellowship of one of the Royal Colleges of Surgeons. The appointment is for 1 year in the first instance, reviewable annually. Salary and conditions of service will be in accordance with the terms and conditions of service issued by the Ministry of Health.

Applications, giving age, nationality, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10, to reach him not later than 27th January, 1951.

NEWPORT, MON. ROYAL GWENT HOSPITAL. (259 Beds.) Required, JUNIOR HOSPITAL MEDICAL OFFICER in the E.N.T. and Ophthalmic Departments. Appointment recognised for the D.L.O. Salary £700–£50–£1000 p.a., less a deduction of £120 for full residential emoluments.

Apply, with names of 2 persons for reference, to—
17, Cardiff-road, Newport. T. A. JONES, Secretary.

ORMSKIRK. COUNTY HOSPITAL, Wigan-road. (400 Beds.) Applications invited for appointment of HOUSE SURGEON for general duties, vacant immediately, and tenable for 6 months. Salary £350–£450 p.a., according to experience, with a deduction of £100 p.a. for residential emoluments. This is a general hospital providing facilities in several specialties, with a full Consultant staff. The Hospital is within easy reach of Liverpool and Southport.

Applications, with full details, should be forwarded as soon as possible to— H. E. BECK, Secretary, Ormskirk and District Hospital Management Committee.
County Hospital, Ormskirk, Lancs.

PERTHSHIRE. BRIDGE OF EARN HOSPITAL. (830 Beds, of which 120 are for General Surgery, including Eyes, E.N.T., and Gynæcology.) There are vacancies for 2 HOUSE SURGEONS for the General Surgical Unit at above Hospital. Salary £350–£450 p.a., according to experience, with a deduction of £100 for board, lodging, and laundry.

Applications, stating age, qualifications, experience, and nationality, with the names of 3 referees, to be sent to the Medical Superintendent, Bridge of Earn Hospital, within 14 days of the appearance of this advertisement.

PERTHSHIRE. BRIDGE OF EARN HOSPITAL. (830 Beds, of which 270 are for Orthopædic cases, including bone and joint tuberculosis.) There are vacancies for 4 HOUSE SURGEONS for the Orthopædic Unit at above Hospital. Salary £350–£450 p.a., according to experience, with a deduction of £100 for board, lodging, and laundry.

Applications, stating age, qualifications, experience, and nationality, with the names of 3 referees, to be sent to the Medical Superintendent, Bridge of Earn Hospital, within 14 days of the appearance of this advertisement.

PONTYPRIDD. CHURCH VILLAGE GENERAL HOSPITAL. (310 Beds—Committee's Base Hospital serving population of 177,000.) Required, SENIOR HOUSE OFFICER (third post) in the Department of Obstetrics and Gynæcology. The post is recognised for the D.Obst. R.C.O.G. 6 months' appointment to commence 11th January, 1951. Salary and conditions of service in accordance with the terms issued by the Ministry of Health.

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, to be sent immediately to the Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD. CHURCH VILLAGE GENERAL HOSPITAL. (310 Beds—Committee's Base Hospital serving population of 177,000.) Required, 2 HOUSE OFFICERS (surgical), first posts. 6 months' appointments to commence in January, 1951. Salary and conditions of service in accordance with the terms issued by the Ministry of Health.

Applications, stating age, qualifications, together with copies of 2 recent testimonials, to be sent immediately to the Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD. CHURCH VILLAGE GENERAL HOSPITAL. (310 Beds—Committee's Base Hospital serving population of 177,000 ; 8 Resident Medical Staff.) Required, HOUSE OFFICER (medical), first or second post. 6 months' appointment. Salary and conditions of service in accordance with the terms issued by the Ministry of Health.

Applications, stating age, qualifications, and experience, with names of 2 referees, to be sent as soon as possible to the Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTYPRIDD. CHURCH VILLAGE GENERAL HOSPITAL. (310 Beds—Committee's Base Hospital serving population of 177,000.) Required, HOUSE OFFICER (surgical), second or third post. Duties to include anæsthetics and service in the Casualty Department. 6 months' appointment. Salary and conditions of service in accordance with the terms issued by the Ministry of Health.

Applications, stating age, qualifications, and experience, with names of 2 referees, to be sent as soon as possible to the Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PONTEFRACT GENERAL INFIRMARY AND THE HYDES HOSPITAL. (92 Beds.) Required, HOUSE SURGEON (first post), Male. 6 months' appointment. Salary at rate of £350 p.a., less £100 for residential emoluments. R practitioners within 3 months of qualification may apply.

Applications should be sent to—
W. BOWRING, Secretary,
Pontefract and Castleford Hospital Management Committee.
Great Northern House, Salter-row, Pontefract.

PONTYPOOL AND DISTRICT HOSPITAL, Pontypool, MON. (115 Beds.) Required, HOUSE OFFICER (surgical), post vacant from 12th February. Salary £350–£450 p.a., in accordance with the number of previous posts held, less a deduction of £100 p.a. for full residential emoluments.

Apply, with the names of 2 persons for reference, to—
17, Cardiff-road, Newport, Mon. T. A. JONES, Secretary.

PONTYPOOL AND DISTRICT HOSPITAL, Pontypool, MON. (115 Beds.) Required, HOUSE OFFICER (medical), post vacant from 1st February. Appointee will work under the directions of the Consultant Physician and the Pædiatrician Salary £350–£450 p.a., in accordance with the number of previous posts held, less a deduction of £100 p.a. for full residential emoluments.

Apply, with names of 2 persons for reference, to—
17, Cardiff-road, Newport, Mon. T. A. JONES, Secretary.

PLYMOUTH SPECIAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for appointment of SENIOR HOUSE OFFICER (resident), Male, at the Isolation Hospital, Beacon Park-road, Plymouth, from registered medical practitioners who have had a minimum of 1 year's hospital experience. A knowledge of infectious diseases and pædiatrics desirable, but not essential, and the applicant should be able to drive a car. The duties will be chiefly in connection with infectious and venereal diseases and the varied clinical work including acute medical cases and early pulmonary tuberculosis provides valuable medical experience in both departments particularly for those reading for a higher degree. The appointment will be for 1 year, terminable by 1 month's notice on either side. Salary £670, less a deduction of £100 for full residential emoluments. There is no accommodation available for a married man.

Applications, together with copies of 3 recent testimonials, should be sent to the Secretary, Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, not later than 22nd January, 1951.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Applications invited from registered medical practitioners for appointments of :—

(1) HOUSE SURGEONS (first posts), Greenbank Road Section, vacant 1st and 7th February, 1951.
(2) HOUSE SURGEON (second or third posts), Devonport Section, vacant immediately.
(3) HOUSE SURGEON (second or third posts), Freedom Fields Section, vacant immediately.
(4) ANÆSTHETIC HOUSE OFFICER (second or third posts), Freedom Fields Section, vacant 1st March, 1951.

DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY.

(5) HOUSE SURGEON (second or third posts), Alexandra Maternity Home, Devonport, vacant 17th February, 1951.
(6) HOUSE SURGEON (second or third posts), Freedom Fields Section, vacant 1st March, 1951. Wide experience can be obtained in obstetrics, including ante- and post-natal clinics.

Appointments for 6 months and terminable by 1 month's notice on either side. Salary and conditions of service in accordance with the National Health Service terms.

Applications, stating age, nationality, qualifications, and experience, with 3 recent testimonials, to be sent by 30th January, 1951, to—

ARTHUR R. CASH, Secretary, Plymouth, South Devon and East Cornwall General Hospital Group.
Head Office, Greenbank-road, Plymouth.

PRESTON ROYAL INFIRMARY. Casualty Officer, vacant January, 1951. Salary in accordance with National Health Service scale—£350–£450 p.a., with a deduction of £100 p.a. for residential emoluments.

Applications, stating age, experience, &c., with copies of recent testimonials, to be sent to the undersigned at the Royal Infirmary, Preston.

JOHN GIBSON, Secretary, Preston and Chorley Hospital Management Committee.

RHYL. ROYAL ALEXANDRA HOSPITAL. Applications invited for the following appointments :—

(*a*) RESIDENT HOUSE SURGEON. Salary and conditions of service in accordance with the terms issued by the Ministry of Health. Post tenable in the first instance for 6 months.

(*b*) RESIDENT HOUSE PHYSICIAN. Salary and conditions of service in accordance with the terms issued by the Ministry of Health. Post tenable in the first instance for 6 months.

Applications, with full details of qualifications, and training, accompanied by 2 testimonials, to be sent forthwith to—

WILLIAM ROBERTS, Secretary,
Clwyd and Deeside Hospital Management Committee.
" Rhianfa," Russell-road, Rhyl, 4th December, 1950.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (718 Beds.) Required, JUNIOR REGISTRAR in Pathology in this large General Hospital containing well-equipped laboratory where excellent opportunities exist for gaining extensive experience. Salary and conditions of service as published by the Ministry of Health.

Applications, stating age, nationality, qualifications with dates, present and previous appointments, and details of experience, together with copies of 2 testimonials of recent date or names of 2 referees, should be sent immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, Essex.

RAMSGATE. THE GENERAL HOSPITAL. (101 Beds.) ISLE OF THANET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON. Appointment will be for a period of 6 months. Salary at rate of £350 p.a., less £100 for residential emoluments. R practitioners within 3 months of qualification may apply.

Applications, stating age, and qualifications, together with copies of 3 recent testimonials, should be sent as soon as possible to the Administrator, The General Hospital, Ramsgate.

RHONDDA. PORTH AND DISTRICT HOSPITAL. (110 Beds.) Required, JUNIOR HOSPITAL MEDICAL OFFICER (surgical). Salary and conditions of service in accordance with the terms issued by the Ministry of Health.

Applications, stating age, qualifications, experience, together with copies of 2 recent testimonials, to be sent immediately to the Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

ROCHDALE. BIRCH HILL HOSPITAL. (General—956 Beds.) Applications are invited for appointment of SENIOR HOUSE SURGEON. The appointment will be for 1 year. Salary in accordance with the terms of service of hospital medical staff in the National Health Service, i.e., £670 p.a. This appointment is recognised by the Royal College of Surgeons for 6 of the 12 months' period of surgical training required of candidates for the final fellowship examinations.

Applications should be sent to the undersigned immediately.

S. HODKINSON, Secretary, Rochdale and District Hospital Management Committee.

Central Offices, Birch Hill Hospital, Rochdale.

ROCHDALE. BIRCH HILL HOSPITAL. (General—956 Beds.) Required, HOUSE SURGEON. The appointment will be for 6 months. Salary in accordance with the terms of service of hospital medical staff in the National Health Service—i.e., £350, £400, or £450 p.a., according to previous experience. This appointment is recognised by the Royal College of Surgeons for 6 of the 12 months' period of surgical training required of candidates for the final fellowship examinations.

Applications should be sent immediately, to—

S. HODKINSON, Secretary, Rochdale and District Hospital Management Committee.

Central Offices, Birch Hill Hospital, Rochdale.

ROCHDALE INFIRMARY. (General—109 Beds.) Required, CASUALTY HOUSE SURGEON. The appointment will be for 6 months. Salary in accordance with the terms of service for hospital medical staff in the National Health Service—i.e., £350, £400, or £450 p.a., according to previous experience. This appointment is recognised by the Royal College of Surgeons for 6 of the 12 months' period of surgical training required of candidates for the final fellowship examinations.

Applications should be sent immediately to—

S. HODKINSON, Secretary, Rochdale and District Hospital Management Committee.

Central Offices, Birch Hill Hospital, Rochdale.

ROCHDALE INFIRMARY. (General—109 Beds.) Required, SENIOR HOUSE OFFICER (orthopædic). The appointment will be for 1 year. Remuneration will be at rate of £670 p.a., and the conditions of service will be in accordance with the terms of service for hospital medical staff in the National Health Service.

Applications should be sent immediately to—

S. HODKINSON, Secretary, Rochdale and District Hospital Management Committee.

Central Offices, Birch Hill Hospital, Rochdale.

SCOTLAND. RED CROSS SANATORIA OF SCOTLAND. (156 Beds.) Applications invited for post of JUNIOR ASSISTANT MEDICAL OFFICER to the above Sanatoria at a salary of £670 p.a., less a deduction for full residential emoluments. A Thoracic Surgical Unit is situated at the Sanatoria. Experience in general medicine essential and in the treatment of pulmonary tuberculosis desirable.

Apply, giving full particulars of qualifications, and experience, together with the names of 2 referees, to the Medical Director, Tor-na-Dee, Milltimber, Aberdeenshire, before 20th January, 1951.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD invite applications for the post of JUNIOR HOSPITAL MEDICAL OFFICER, Ross Memorial Hospital, Dingwall. The Hospital admits general medical and surgical cases, and has a maternity unit, and outpatient clinics are held by Visiting Consultants. The post is non-resident, and the salary is in accordance with the scale of £700–£50–£1000. Applicants should have previous experience in obstetrics in hospital or general practice.

The schedule of application and further particulars of the post may be obtained from the undersigned, with whom applications should be lodged by 15th January, 1951.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Raigmore Hospital, Inverness.

SCUNTHORPE AND DISTRICT WAR MEMORIAL HOSPITAL. (256 Beds.) SCUNTHORPE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the following appointments at above Hospital:—

(*a*) HOUSE SURGEON, with associated duties in E.N.T., now vacant.

(*b*) HOUSE SURGEON, with associated duties in gynæcology and radiotherapy, vacant 4th February.

(*c*) CASUALTY OFFICER, vacant 12th February, busy department.

(*d*) HOUSE PHYSICIAN, vacant 25th January. The medical department has large outpatient clinics and a quick turnover of inpatients.

National terms and conditions of service.

Applications, with copy testimonials or names of 2 referees, to the Secretary, The War Memorial Hospital, Scunthorpe, Lincs.

SCARBOROUGH HOSPITAL, Yorkshire. (163 Beds.) Applications invited from Male or Female registered medical practitioners for post of RESIDENT HOUSE PHYSICIAN. Salary in accordance with the national scale and the appointment will be for 6 months.

Applications, stating age and qualifications, with testimonials, to be sent to the Secretary.

SHREWSBURY. ROYAL SALOP INFIRMARY. (240 Beds.) Required, ORTHOPÆDIC HOUSE SURGEON/CASUALTY OFFICER (Male or Female), vacant immediately. Salary £350–£450 p.a., less a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications, nationality, and experience, accompanied by copy testimonials, should be sent to the Secretary, Group 15 Hospital Management Committee, Royal Salop Infirmary, Shrewsbury.

J. P. MALLETT, Secretary.

Royal Salop Infirmary, Shrewsbury, 23rd September, 1950.

SHEFFIELD. NETHER EDGE HOSPITAL. Required, HOUSE OFFICER. Principal duties will be in connection with the Maternity Department which deals with approximately 1000 cases p.a. (a new Maternity Unit has just been opened), but the Officer will also be required to assist in the Medical Wards (at present approximately 200 Beds Chronic Sick).

Forms of application may be obtained from the undersigned at Nether Edge Hospital, Sheffield, 11.

W. STANSFIELD, Secretary,
Sheffield No. 1 Hospital Management Committee.

SHEFFIELD. NETHER EDGE HOSPITAL. Applications invited from suitably qualified practitioners for the resident post of SENIOR HOUSE OFFICER. Main duties will be in connection with the new maternity unit but will also be required to assist in the wards for long-stay medical cases and may also be required to assist in the new Rheumatism Research Unit. Tenable for 1 year. Salary £670 p.a.

Forms of application may be obtained from the undersigned at Nether Edge Hospital, Sheffield, 11.

W. STANSFIELD, Secretary.

SHEFFIELD REGIONAL HOSPITAL BOARD. Sheffield MANAGEMENT COMMITTEE. SHEFFIELD NO. 4, RADIOTHERAPY CENTRES. Medical Men and Women desirous of taking up radiotherapy are invited to apply for the post of RESIDENT RADIOLOGICAL OFFICER at Sheffield. The appointment will have the status of a Senior House Officer on a salary of £670 p.a. Approved courses for the D.M.R.T. (R.C.P. & S.) are held at the Sheffield National Centre for Radiotherapy and will be open to the successful candidate, facilities being given to attend these.

Applications for further particulars should be addressed to the Secretary, "Broom Cross," Tree Root-walk, Sheffield, 10.

SHEFFIELD NO. 1 HOSPITAL MANAGEMENT COMMITTEE invite applications for the non-resident appointment of ASSISTANT PATHOLOGIST at the City General Hospital, Sheffield, and associated laboratories including the Regional Blood Transfusion Centre. Previous laboratory experience will be an advantage. Salary £700–£50–£1000 p.a. The appointment will be for a period not exceeding 3 years in the first instance.

Forms of application may be obtained from the undersigned at Nether Edge Hospital and must be returned not later than 9th January, 1951. W. STANSFIELD, Secretary.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL HOSPITAL UNIT. Applications are invited from registered medical practitioners for the non-resident post of SENIOR HOUSE OFFICER to the Plastic and Jaw Unit at the above Hospital. Salary will be at the rate of £670 p.a.

Applications, stating age, qualifications, and experience, together with the names of 3 referees, should be forwarded immediately to—

JOSEPH GRIFFITH, Chief Administrative Officer,
The United Sheffield Hospitals.

Central Office, The Royal Hospital, Sheffield, 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL HOSPITAL UNIT. Applications are invited from registered medical practitioners for the non-resident post of MEDICAL REGISTRAR at the above Hospital. Possession of the M.R.C.P. is essential.

Applications, stating age, qualifications, and experience, together with the names of 3 referees, should be forwarded immediately to—

JOSEPH GRIFFITH, Chief Administrative Officer,
The United Sheffield Hospitals.

Central Office, The Royal Hospital, Sheffield, 1.

SOUTHALL, MIDDLESEX. ST. BERNARD'S HOSPITAL FOR NERVOUS AND MENTAL DISORDERS. Applications invited for a post of HOUSE OFFICER. Facilities are afforded junior staff to become versed in all branches of psychiatry. Salary scales and conditions of service in accordance with those laid down by the Ministry of Health, less deductions for board and lodging, if resident.

Applications, giving full details, and copies of 3 recent testimonials, should be sent to the Physician-Superintendent within 14 days of appearance of this advertisement.

SOUTHAMPTON. ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL. BOROUGH GENERAL HOSPITAL. Applications are invited by the Southampton Group Hospital Management Committee for whole-time post of JUNIOR E.N.T. REGISTRAR at the above Hospitals. Occasional work at other hospitals may be required. The post provides experience in all branches of E.N.T. work including audiometry. The group includes a diagnostic and distributing hearing-aid centre. Salary £670 p.a., from which a deduction will be made for residential emoluments.

Applications, with copies of 3 recent testimonials, to be forwarded as soon as possible to the Secretary, Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL. (290 Beds.) HOUSE SURGEONS (3) required. Posts vacant December and mid-January. Tenable for 6 months. Salary £350–£450 p.a., according to number of posts previously held, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by the Ministry of Health.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON BOROUGH GENERAL HOSPITAL. HOUSE SURGEON (resident) required immediately. Post tenable for 6 months. Salary £350–£450 p.a., according to number of posts previously held, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by the Ministry of Health.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Required, HOUSE OFFICER (medical), Male or Female, post vacant in the near future. Salary in accordance with national scale for House Officers. Appointment for 6 months in the first instance. Applications from recently qualified medical practitioners will be considered.

Applications, giving age, qualifications, and particulars of previous experience, including national service, if any, with copy testimonials, should be forwarded to the Medical Superintendent, City General Hospital, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (1000 Beds.) Applications invited for 2 HOUSE OFFICERS (surgical), Male or Female, now vacant. Posts recognised for F.R.C.S. Salary in each case in accordance with National Health Service scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including national service, to the Medical Superintendent at the Hospital.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. BURSLEM HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. HOUSE OFFICER (medical) required, post vacant very shortly. Salary in accordance with the National Health Service scale for House Officers.

Apply, with copy testimonials, stating age, nationality, and full details of previous service including national service, as soon as possible to— THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT HOSPITAL MANAGEMENT COM-MITTEE. Applications are invited for the following posts within group hospitals :—

North Staffordshire Royal Infirmary (475 Beds)
HOUSE OFFICER (orthopædic), first post.
HOUSE OFFICER (E.N.T.), second or third post. Recognised for D.L.O.
HOUSE OFFICER (general surgery), second post. Recognised for F.R.C.S.
HOUSE OFFICER (surgical), first post, combining main duties at Longton Hospital (55 Beds).

Bucknall Isolation Hospital (202 Beds)
HOUSE OFFICER (medical), second or third post.

Salary in all cases in accordance with national scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including national service, to the undersigned at Princes-road, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary.

ST. ALBANS CITY HOSPITAL. Required, Casualty OFFICER (Male). Appointment for 6 months in the first instance. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications should be addressed to the Secretary, Osterhills, Normandy-road, St. Albans.

ST. HELENS HOSPITAL. (183 Beds.) Required, Resident HOUSE SURGEON. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 p.a. for residential emoluments.

Applications to be forwarded as soon as possible to—
N. RICHARDS, Secretary, St. Helens and
District Hospital Management Committee.
Group Office, County Hospital, Whiston, near Prescot, Lancs.

SWINDON HOSPITALS. Accident and Orthopædic DEPARTMENTS. Required, RESIDENT HOUSE SURGEON to above, which are associated with the Wingfield-Morris Orthopædic Hospital, Oxford. Salary in accordance with the approved terms, including the additional £50 p.a.

Applications, giving age, qualifications, and details of service, with names of 1–3 referees, should be sent to the Secretary, Swindon and District Hospital Management Committee, Victoria Hospital, Swindon, as soon as possible.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON to the Senior Surgeon, vacant 1st January, 1951. Salary £350, £400, or £450 a year, according to experience, less £100 for board and residence.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (326 Beds.) WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON to the Orthopædic Department, vacant immediately. Salary at the rate of £350, £400, or £450 a year, according to experience, less £100 for board and residence.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

TAPLOW, MAIDENHEAD, BERKS. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE PHYSICIAN required for Research in Juvenile Rheumatism, vacant 18th February. Post offers scope for those interested in research, pædiatrics, rheumatology, or cardiology, and previous experience in one of these is desirable. Salary on national scale.

Applications, stating age, qualifications, and experience, with dates, and copies of 2 testimonials, to be sent to the Administrative Officer.

WAKEFIELD. GENERAL HOSPITAL, Park Lodge-lane. Required, HOUSE PHYSICIAN for the Medical Unit and with some anæsthetic duties and to work under the supervision of the Medical Superintendent, appointment vacant immediately. The post is resident and the salary scale £350–£450 p.a., according to experience, less £100 as residential emoluments.

Applications should be addressed to the Medical Superintendent. W. READ, Secretary, Hospital
Management Committee No. 9, Wakefield A Group.

WARWICK. CENTRAL HOSPITAL, near Warwick. SENIOR HOUSE OFFICER required at the above Hospital, which contains 1600 Beds, including a neurosis unit and inpatient and outpatient clinics for adults and children. Instruction is given for the D.P.M. Salary £670 p.a. A good house or alternatively a flatlet is available for which a charge will be made. The appointment is pensionable under the National Health Service (Superannuation) Regulations, 1950.

Applications should be sent to the Medical Superintendent, giving names and addresses of 3 referees, within a fortnight of the appearance of this advertisement.

WHISTON. COUNTY HOSPITAL. (880 Beds.) Required, RESIDENT HOUSE SURGEON. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 p.a. for residential emoluments.

Applications to be forwarded to the undersigned as soon as possible. N. RICHARDS, Secretary, St. Helens and
District Hospital Management Committee.
Group Office, County Hospital, Whiston,
near Prescot, Lancs.

WHISTON. COUNTY HOSPITAL. (880 Beds.) Required RESIDENT HOUSE PHYSICIAN. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 for residential emoluments.

Applications to be forwarded to the undersigned as soon as possible. N. RICHARDS, Secretary, St. Helens and
District Hospital Management Committee.
Group Office, County Hospital, Whiston,
near Prescot, Lancs.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. Required, HOUSE SURGEON at the above Hospital. The salary for this appointment is in accordance with the terms and conditions laid down for hospital medical and dental staffs.

Applications, stating age, nationality, qualifications, and previous medical appointments, together with the names of 2 referees, should be received by the undersigned as soon as possible. T. W. HURST, Secretary,
Wigan and Leigh Hospital Management Committee.
Knowsley House, Wigan, 19th December, 1950.

WIGAN. BILLINGE HOSPITAL, Orrell, near Wigan. Required, OBSTETRICAL HOUSE OFFICER at the above Hospital, post vacant 1st February, 1951. The appointment is a resident one, and salary is in accordance with the terms laid down for hospital medical and dental staffs, less £100 p.a. for residential emoluments.

Applications, stating age, nationality, and qualifications, together with the names of 2 referees, should be forwarded not later than the 11th January, 1951, to—
T. W. HURST, Secretary,
Wigan and Leigh Hospital Management Committee.
Knowsley House, Wigan, 19th December, 1950.

WOLVERHAMPTON HOSPITAL MANAGEMENT COM-MITTEE, GROUP NO. 16, BIRMINGHAM REGION. Applications invited from registered medical practitioners for following appointments :—

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)
JUNIOR CASUALTY OFFICER, vacant now.
HOUSE SURGEON (Fracture and Orthopædic Department), vacant now.
SENIOR HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.
HOUSE SURGEON (Ear, Throat and Nose Department), vacant now.
SENIOR HOUSE OFFICER (Ear, Throat and Nose Department), vacant 1st February, 1951.
HOUSE PHYSICIAN, vacant shortly.
HOUSE PHYSICIAN (pædiatric), vacant shortly.
HOUSE SURGEONS (general surgery), vacant shortly.
The Royal Hospital (Women's Branch), recognised for the examination of M.R.C.O.G.
RESIDENT MEDICAL OFFICER, vacant shortly.
New Cross Hospital, Wolverhampton
HOUSE PHYSICIAN, vacant 1st February, 1951.

All appointments subject to terms and conditions of service issued by the Ministry of Health.

Applications, with copies of 3 recent testimonials, to be sent to W. COCKBURN, Group Secretary.
The Royal Hospital, Wolverhampton.

WORCESTER. POWICK MENTAL HOSPITAL, near WORCESTER. SOUTH WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens MEDICAL OFFICER of Registrar status required at above Hospital. Experience of mental hospitals not essential but desirable. Salary and conditions in accordance with the terms for hospital medical staff.

Apply as soon as possible, stating full particulars, together with names of 2 referees, to the Medical Superintendent.

WORKSOP, NOTTS. KILTON HOSPITAL. Required, OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON, vacant 1st January, 1951. National scale of salary.

Applications, stating age, qualifications, and experience, with 2 names for reference, should be forwarded to the Secretary, Worksop and Retford Hospital Management Committee, Victoria Hospital, Worksop.

YORK A AND TADCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the following posts :—

County Hospital, York (General Hospital of 269 Beds)
City Hospital, York (Modern General Hospital of 265 Beds)

E.N.T. HOUSE SURGEON. The E.N.T. Department which is mainly at the County Hospital, York, has approximately 30 Beds, is recognised for the D.L.O., and offers excellent opportunities for learning the specialty. The appointment is for 6 months initially, previous experience preferable but not essential. Post vacant from 16th January, 1951. Salary £400 for second post held, £450 for third post, less £100 for residence.

Military Hospital, York (Civilian Wing) (52 Beds)

RESIDENT MEDICAL OFFICER. This Hospital is an annexe to the County Hospital, York. There are 14 gynæcological beds, 28 surgical beds, and 10 medical beds. The post is graded Senior House Officer, is for 6 months in first instance, and is vacant on 21st January, 1951. Salary £670, with a deduction for residence.

County Hospital, York (General Hospital of 269 Beds with full Consultant staff)

CASUALTY OFFICER (with charge of orthopædic beds). Post is graded House Officer (second, third, or subsequent post) and is vacant on 17th January, 1951, for 6 months. Salary £400 for second post, £450 for third or subsequent post, less £100 for residence. Residential accommodation is available, but special arrangements can be made if the applicant wishes to be non-resident, or partly resident.

County Hospital, York (General Hospital of 269 Beds)
City Hospital, York (modern General Hospital of 265 Beds)
Yearsley Bridge Hospital, York (Infectious Diseases Hospital of 86 Beds)

JUNIOR HOSPITAL MEDICAL OFFICER (pædiatrics and infectious diseases) to spend approximately half of time in connection with pædiatric duties at the County Hospital (22 pædiatric beds), City Hospital (32 pædiatric beds), and other hospitals in the group, and approximately half of time at Yearsley Bridge Hospital. Candidates should have had previous experience of pædiatrics and infectious diseases. Preference will be given to the holders of the D.C.H. The post is vacant immediately and the appointment is for 1 year in the first instance. Residential accommodation available ; otherwise applicant will be required to live near Hospital. Salary £700–£50–£1000, with deduction if resident. Terms and conditions of service are those laid down by the Minister of Health.

Applications, giving details of age, nationality, qualifications, and experience, together with the names of 2 referees, to be forwarded immediately to—

F. A. MILNES, F.H.A., A.L.A.A., Secretary,
York A and Tadcaster Hospital Management Committee.
Bootham Park, York.

Public Appointments

AYLESBURY, BUCKS. STOKE MANDEVILLE HOSPITAL (Ministry of Pensions). (A Hospital of 609 Beds for medical, surgical, plastic, gynæcological, and head and spinal injury cases.) Required, ANÆSTHETIC OFFICER. The post offers wide experience and is recognised for the D.A. Salary range £650–£900 p.a. living in, with an additional £100 a year if living out.

On application, practitioners should state age, qualifications with dates, and nationality, and send copies of 2 recent testimonials, to the Director General of Medical Services, Ministry of Pensions (M.S.2), Norcross, Blackpool, Lancs.

COLONIAL MEDICAL SERVICE. In the larger Colonies MEDICAL OFFICERS are required for general duties, including hospital and district work. These appointments offer great scope for the practice of many branches of medicine and surgery with a considerable measure of independence and personal responsibility. Appointments can be made on a permanent basis with pension (non-contributory) at age of 50 or 55, or on a temporary basis with gratuity. Secondment from the National Health Service can usually be arranged for periods up to 6 years with continuation of superannuation contributions and the payment of a resettlement grant on reversion to the National Health Service. Salaries range from £860 to £1630 a year, the starting salary depending upon age and experience. In most territories in Africa the scale for newly appointed doctors with an approved higher qualification is £1050–£1600 a year, with a higher point of entry according to experience. There are many specialist and administrative posts with salaries above this scale available for officers in the Service on promotion. Free passages are granted in both directions. Income-tax is very low. Tours of service vary from 10 months in Nigeria to 4 years in Kenya. Houses with heavy furniture are provided in most territories at a rent of about 10% of salary. Annual local leave is available and generous home leave is granted after each tour. Study leave on full pay is available for those who wish to acquire higher qualifications. Social and recreational amenities are good. Officers serving in East and Central Africa usually prefer to educate their children within that area, where schooling is available, or in South Africa. The short tours in West Africa enable frequent visits to be made to children being educated at home. Many officers have their children with them in West Africa until they reach school age.

Application forms can be obtained from the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1. (Ref. no. 27215/14.)

BIRMINGHAM. CITY OF BIRMINGHAM. Applications are invited for the appointment of ASSISTANT MEDICAL OFFICER (Male or Female) in the Maternity and Child Welfare Department. The duties will include work in connection with children of all ages in the care of the Children's Committee, in addition to normal maternity and child-welfare work. Applicants should have had experience in work with mothers and children, including a 6 months' resident post in a maternity hospital and in a children's hospital. The D.P.H. or D.C.H. will be considered an additional qualification. The salary scale is £735 p.a., rising by annual increments of £25 to a maximum of £935 p.a. ; the commencing salary within that scale depending on the Medical Officer's experience. In the event of any amendment of agreed national scale the new rate will apply. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, to the candidate passing a medical examination, and to 1 month's notice on either side.

Applications, endorsed " Assistant Medical Officer for Maternity and Child Welfare," giving full details of training and experience, together with copies of 3 recent testimonials, should be submitted on a form obtainable from the Medical Officer of Health, Council House, Birmingham, 3, and returned to him on or before the 15th January, 1951.

BIRMINGHAM. CITY OF BIRMINGHAM. PUBLIC HEALTH DEPARTMENT. Applications are invited from registered medical practitioners for the whole-time appointment of SENIOR ASSISTANT MEDICAL OFFICER OF HEALTH for Mental Health. Applicants should have had special experience in all branches of the Mental Health Service and should hold the D.P.M. The successful candidate will be responsible to the Medical Officer of Health for the general administration and medical direction of all branches of the Council's Mental Health Services and for the performance of such other duties in this connection as may be required. The salary will be on the scale £1250–£50–£1500, the commencing salary to be fixed within this scale in accordance with the applicant's experience. A motor-car allowance scheme is in operation for officers using their own cars for official duties. The candidate selected will be required to pass a medical examination, and to contribute to the Local Government Superannuation Act, 1937, and to the Birmingham Municipal Officers Widows and Orphans Pensions Fund. The appointment is terminable at 3 months' notice.

Applications, accompanied by not more than 3 recent testimonials and endorsed on the envelope " Senior Assistant Medical Officer of Health for Mental Health," should be forwarded to the Medical Officer of Health, Public Health Department, Congreve-street, Birmingham, 3, not later than 20th January, 1951. Canvassing, directly or indirectly, will lead to disqualification.

DUBLIN. LOCAL APPOINTMENTS COMMISSION. Position vacant : Longford COUNTY MEDICAL OFFICER. Salary £1075–£26 17s. 6d.–£1290.

Application forms and particulars from the Secretary, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms : 5 P.M. on 19th January, 1951.

FACTORY DOCTORS : Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor under the Factories Acts, 1937 and 1948, is vacant. Applications should be sent to the Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of application*
LONGDENDALE AND GLOSSOP ..	CHESTER ..	20TH JANUARY, 1951

IRELAND. NATIONAL RADIOGRAPHY ASSOCIATION. Appointment of MEDICAL DIRECTOR. Salary £1800 p.a. Essential qualification : Candidates must be registered medical practitioners. Desirable qualifications : Organising ability, possession of D.M.R. or D.M.R.E. (or equivalent qualification), considerable experience of (i) interpretation of chest films and (ii) mass radiography. Duties : To organise and administer a national mass radiography service in Ireland. Appointment will be whole-time and temporary for a period not exceeding 2 years, but may be renewed for such further period as the Association may decide.

Further particulars and application forms obtainable from the Temporary Secretary, National Radiography Association, c/o Department of Health, Custom House, Dublin, to whom completed application forms should be forwarded to reach him not later than 3rd February, 1951.

January, 1951. National Radiography Association.

KUWAIT, PERSIAN GULF. THE STATE HOSPITAL invites applications for the post of Lady MEDICAL OFFICER for the female clinic and wards. Must have been qualified at least 5 years and have good gynæcological and obstetrical experience (not necessarily surgical). Maximum service in hospitals preferred, but clinic work and experience of anæsthesia advantageous. Salary £2000 p.a., with increments (no income-tax), plus £250 p.a. for purchase and running of motor-car. Free accommodation ; free air passages on appointment, leave, and termination. Approximately 4 months' leave every 2 years. Some tropical or Middle Eastern experience desirable. Must learn Arabic, be British born, non-Jewish. The C.M.O., 5 members of Medical Staff, Matron, and Radiographer are British.

Apply, giving full particulars of qualifications and experience, and names of 3 referees, to Address, No. 497, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

NEWPORT. COUNTY BOROUGH OF NEWPORT. Applications for position of ASSISTANT MEDICAL OFFICER are invited from Women who are registered medical practitioners, and, preferably, possess a D.P.H. Salary £735–£25–£935 p.a.

Applications, on forms to be obtained from the undersigned, to be received by 27th January, 1951. Canvassing, directly or indirectly, will disqualify.

D. E. LAWRENCE, Medical Officer of Health.
Civic Centre, Newport, Mon.

LEEDS. CHAPEL ALLERTON HOSPITAL (Ministry of Pensions). (A Hospital of 415 Beds for the treatment of general, medical, surgical, orthopædic and limbless cases. Required, SENIOR MEDICAL OFFICER. Applicants should have held resident posts and possess a higher medical qualification. Salary range £900–£1300 p.a. living in, with an additional £100 p.a. if living out.

When applying, registered medical practitioners should state age, qualifications with dates, and nationality, and send copies of 2 recent testimonials, to the Director General of Medical Services, Ministry of Pensions (M.S.2), Norcross, Blackpool, Lancs.

NORTHAMPTONSHIRE COUNTY COUNCIL. Applications are invited for the whole-time appointment of ASSISTANT MEDICAL OFFICER for Maternity and Child Welfare and School Medical Inspection (Woman), on the salary scale of £850–£50–£1150 p.a. and on the terms of the recent award of the Industrial Court. Travelling and subsistence allowances will be paid on the scale from time to time approved by the Council. Candidates should possess special knowledge and experience in maternity and child-welfare work and preference will be given to those who hold the D.C.H. and have been approved by the Minister of Education for the examination and ascertainment of handicapped pupils. The Officer appointed will work under the direction of the County Medical Officer of Health. The appointment will be subject to the Local Government Superannuation Acts and will be determinable by 3 months' notice on either side.

Applications, stating age, qualifications, and experience, with the names of 2 referees, should reach the undersigned not later than the 3rd February, 1951.

J. ALAN TURNER, Clerk of the County Council.

County Hall, Northampton, 28th December, 1950.

NORWICH. CITY OF NORWICH. Applications are invited from registered medical practitioners for whole-time appointment of ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER. Salary £735 p.a., rising by annual increments of £25 to £935 p.a., the commencing salary to be paid having regard to experience and qualifications.

Particulars can be obtained from the undersigned, and applications should be received by him not later than 18th January, 1951.

V. F. SOOTHILL,

Medical Officer of Health and Senior Medical Officer.

68, St. Giles'-street, Norwich.

PRESTON. COUNTY BOROUGH OF PRESTON. Applications are invited from duly qualified registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH (Male or Female). Appointee will be required to carry out the medical inspection of school-children, to do maternity and child welfare work and to perform such other duties as may be allotted to him by the Medical Officer of Health. The salary will be on an appropriate step in the grade £735–£25–£935 p.a., according to previous experience. This salary is a consolidated salary and includes cost-of-living bonus. The person appointed will be required to pass a medical examination and to contribute to the Corporation's superannuation fund.

Further particulars and forms of application may be obtained from the Medical Officer of Health, Municipal Building, Preston, and should be returned to the undersigned endorsed "Assistant Medical Officer of Health," not later than 22nd January, 1951.

W. E. E. LOCKLEY, Town Clerk.

Municipal Building, Preston.

ROSS AND CROMARTY. COUNTY COUNCIL OF ROSS AND CROMARTY. PUBLIC HEALTH DEPARTMENT. Applications are invited for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH for special duty as School Medical Officer. Possession of the D.P.H. will be an advantage. Salary commencing at £735 and rising by annual increments of £25 to £935, with placing according to experience. The salary will be adjusted to comply with national scale when adopted. The successful applicant must provide a motor-car for which will be paid mileage allowance in accordance with the County Council scale. If required a house will be provided by the County Council, for which a rent will be charged. Further information, if desired, can be obtained from the County Medical Officer of Health, Public Health Department, Dingwall.

Applications, accompanied by 3 copies thereof, and of recent testimonials, to be lodged with the undersigned not later than 13th January, 1951. Canvassing, directly or indirectly, will be a disqualification.

W. D. ROSS, County Clerk.

County Buildings, Dingwall, 18th December, 1950.

ROYAL AUSTRALIAN NAVY

Applications are invited from legally qualified medical practitioners for appointment as MEDICAL OFFICERS in the Royal Australian Navy. Previous commissioned service on full pay in British Forces may be taken into consideration in determining pay and seniority on appointment. Minimum yearly emoluments on appointment for single officer £1085 and for married officer £1244. Increment of £54 15s. payable after 2 years' service. Gratuity of £500 payable after completion of 4 years' service, or pro-rata on approved discharge after completion of 2 years' service. Emoluments payable in sterling currency until departure from U.K. First appointment is for short term service with prospect, if desired, of appointment to Permanent List.

Full details may be obtained from R.A.N. Liaison Officer, Canberra House, 85, Jermyn-street, London, S.W.1, and Secretary, Department of Navy, Melbourne, S.C.1.

MANCHESTER. CITY OF MANCHESTER. Applications are invited from registered medical practitioners for appointment as ASSISTANT MEDICAL OFFICER in the Maternity and Child-welfare Section of the Health Department. Applicants should have obstetric or/and pædiatric experience and will be required to undertake duties in clinics. Possession of the D.P.H., D.C.H., or D.Obst.R.C.O.G. qualifications will be essential. The salary scale is £735–£935 p.a., plus a temporary bonus of £65 p.a.

A form of application can be obtained on request, and must be sent, with copies of 3 recent testimonials, in an envelope marked "Assistant Medical Officer, Maternity and Child Welfare," to me only, and not to any member of the Council, not later than 13th January, 1951. Canvassing is prohibited.

PHILIP B. DINGLE, Town Clerk.

Town Hall, Manchester, 2.

General Practice

For an Executive Council post apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

CHELMSFORD, ESSEX. Applications invited for death VACANCY (mixed urban and rural). List at present approximately 1950. Residence and surgery may be available. Apply on Form E.C.16A before 15th January, 1951, to the undersigned.

W. A. CHAPMAN, Clerk, Essex Executive Council.

131/3, Fillebrook-road, Leytonstone, E.11.

SUNBURY-ON-THAMES. Applications invited for VACANCY (urban). List at present approximately 1900. Residence and surgery may be available. Apply on E.C.16A before 13th January, 1951, to—

F. J. ASHFORD, Esq., Clerk,
Middlesex Executive Council.

Gloucester House, Gloucester Gate, N.W.1.

Miscellaneous

HEALTH SERVICES ACT (NORTHERN IRELAND), 1948
AND HEALTH SERVICES (MEDICAL PRACTICES COMPENSATION) REGULATIONS (NORTHERN IRELAND), 1950

COMPENSATION TO DOCTORS FOR THE LOSS OF THE RIGHT TO SELL THE GOODWILL OF THEIR PRACTICES

The following classes of persons are eligible to claim compensation for the loss of the right to sell the goodwill of the practices concerned :—

(1) doctors whose names were on the medical list of the Northern Ireland General Health Services Board on the 5th July, 1948, and who were practising as principals immediately before that date ;

(2) doctors who retired from practice, or the personal representatives of doctors who died, between the passing of the Act —4th February, 1948—and 5th July, 1948, and whose practices have not been sold in whole or in part.

The Ministry will endeavour to issue claim forms to all persons believed to be eligible to claim, but if any person who considers that he has a title to compensation does not receive a claim form within 14 days after the issue of this notice he should apply to the Ministry of Health and Local Government, Stormont, Belfast, or to the Northern Ireland General Health Services Board, 27, Adelaide-street, Belfast.

The statutory time limit for the submission of claims is the 28th February, 1951. The Ministry has a limited power of extension in any case where a personal representative of a deceased practitioner has not been appointed in time to allow of submission by this date.

Ministry of Health and Local Government.

Stormont, Belfast, 23rd December, 1950.

Assistant Editor. Applications are invited from medical Men, preferably 27–30 years of age, for appointment as a Junior Assistant Editor in our office.—Please address : The Editor, THE LANCET, 7, Adam-street, Adelphi, London, W.C.2. (Mark envelope "Personal.")

Young Lady seeks position as Secretary/Receptionist, previous experience. Preferably London or suburbs.—Address, No. 496, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Harley-street and District. Consulting-room, full and part time, at moderate rents.—ELGOOD & Co., 1, Bentinck-street, Welbeck-street, W.1 (WELbeck 8974).

"Pregnancy Diagnosis by the Xenopus Method." 24-hour service.—Send specimen of urine and £1 1s. fee to : M.O. LABORATORIES LTD., 24, Welbeck-way, London, W.1.

For Sale. Wolf Cystoscope complete with examining and double catheterising sheaths. Almost unused. Offers.—Address, No. 498, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

New Cars stay new if the upholstery is protected by loose covers.—Write or phone : CAR COVERALL, Department 9 168, Regent-street, London, W.1 (REGent 7124–5).

Guineapigs, Rabbits of all types for Research. Prompt delivery, keen prices.—GOODCHILD'S, near Crawley, Sussex (Telephone : Poundhill 2167).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141) who are specialists in this kind of work.

Typewriting. Accurate speedy service. Testimonials, theses, notes.—HARRIS, 15, Arkwright Mansions, Finchley-road, N.W.3 (HAMpstead 7949).

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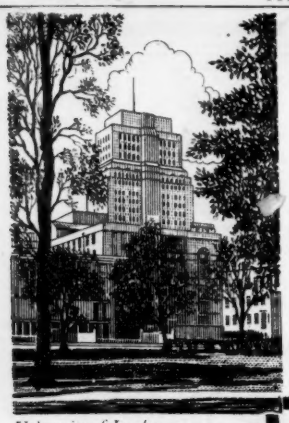

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